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WASTEWATER MANAGEMENT STUDY FOR CHICAGO-SOUTH END OF LAKE MICHI--ETC(U)

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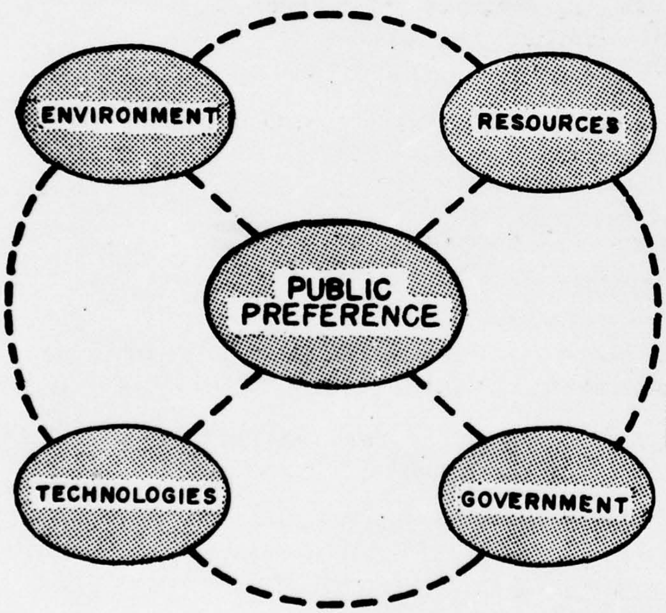
WASTEWATER MANAGEMENT STUDY FOR

CHICAGO SOUTH END of LAKE MICHIGAN



APPENDIX H

PUBLIC INVOLVEMENT / PARTICIPATION PROGRAM

410 079

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

JULY 1973

556p.

REPORT COMPOSITION

The survey report is divided into a Summary, and 9 Appendices. A charge for each appendix and summary report to cover the cost of printing will be required, should purchase be desired. The appendices each contain a different category of information. Alphabetically identified, the appendices are:

A. Background Information - This appendix includes the population and industrial projections, wastewater flows and the engineering data used as a basis for planning.

B. Basis of Design and Cost - This appendix contains the criteria and rationale used to design and cost the final alternative wastewater treatment system components.

C. Plan Formulation - The appendix presents the planning concepts and procedures used in developing the alternative wastewater management plans that were examined during the study.

D. Description and Cost of Alternatives - This appendix contains a cost description and construction phasing analysis for each of the final five regional wastewater management alternatives. Components of these alternatives are described in detail in Appendix B.

E. Social - Environmental Evaluation - This report provides an assessment of the social and environmental impacts likely to arise from the implementation of the final five alternatives.

F. Institutional Considerations - This report presents an assessment of the institutional impacts likely to arise from implementation of the final five alternatives.

G. Valuation - This appendix presents a broad evaluation of the implications and use potential inherent in the final five alternatives.

H. Public Involvement/Participation Program - This appendix documents the program used to involve the public in the planning process.

I. Comments - This appendix contains all of the formal comments from local, State and Federal entities as the result of their review of the other appendices and the Summary Report. Also capsulized are the views of citizens presented at public meetings.

The Summary document presents an overview of the entire study.

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

WASTEWATER MANAGEMENT STUDY

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

DEPARTMENT OF THE ARMY
Chicago District, Corps of Engineers
219 South Dearborn Street
Chicago, Illinois 60604

PREFACE

The purpose of this appendix is to describe the involvement and extent of public participation in the plan formulation process for the Chicago-South End of Lake Michigan Wastewater Management Study. The general procedures used by the Chicago District of the Corps of Engineers to ensure the public's involvement are explained, as are the nature and extent of the general public meetings, the interaction with citizen advisory groups, interagency coordination, and the relationships with the communication media; all an integral part of the public involvement program. Various methods of communication by which information was disseminated to the public and feedback solicited are also presented.

Through a description of its evolution, the results of the public participation program, the importance of public involvement to the planning process, and its impact on the final study product are discussed. These factors are highlighted by: (1) study-related data provided to the Chicago District; (2) suggestions on study direction; (3) comments regarding system design and component's functions; and (4) the extensive coordination with other agencies and groups undertaken to insure a comparability in institutional, environmental, and social considerations.

An overview provides a summary of the program. It includes an historical perspective of public involvement; an explanation of the objectives, approach and structure of the program; describes the evolution of events (stages) during the study; and concludes with an analysis of the program's effectiveness. The succeeding text is divided into summaries of public involvement program as it evolved during the various five study stages. This information is presented sequentially as follows:

H	Program Overview
H-I	Stage I Initiation of Study
H-II	Stage II Initial Alternatives
H-III	Stage III Intermediate Alternatives
H-IV	Stage IV Selection of Final Alternatives
H-V	Stage V Agriculture Developments

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

PROGRAM OVERVIEW

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

TABLE OF CONTENTS

PROGRAM OVERVIEW

FIGURES AND ATTACHMENTS

HISTORICAL PERSPECTIVE OF PUBLIC INVOLVEMENT

Traditionally, public involvement in water resources development has been limited to those interests desiring projects which provided basic economic improvement and essentially little else. This emphasis on economics reflected a national goal of overcoming the Great Depression of the 1930's which had seriously undermined the socio-economic structure of the country. However, within the last two decades, the country has recovered to the extent that an unparalleled standard of living and affluence has been achieved by many. As the standard of living improved, the need and public desire to redirect our national goals have become predominant. This public concern was supported by legislation at the local, state, and Federal levels. Accompanying this redirection of national priorities has been a corresponding public involvement. Various segments of the public have participated in the planning for all types of public and private improvements, including those for water and related land resources development. Many sectors of the public are becoming increasingly aware and concerned with the environmental degradation caused by water pollution and its related problems. They are also aware of the extensive planning efforts required to alleviate these problems.

It is important at this point to recognize that there are different public sectors and there are specific ways in which their attitudes are expressed. Interest of the public as a whole has been expressed through legislation. However, the individual viewpoints of the segments that comprise the public are represented by civic, industrial, environmental, and conservationist groups. Together, these groups are considered to be "the public", and their views constitute a viable gage of public opinion and desires. As the awareness and concern of these groups evolved, so too did their desire and willingness to play an active role both in the development and screening of alternative solutions. This public desire for multiobjective planning was ultimately reflected by the U.S. Congress in its enactment of the National Environmental Protection Act of 1969 and the Flood Control Act of 1970. The latter required that the planning for water and related land developments be responsive to the multiple objectives for enhancing the quality of the environment and social well-being as well as national and regional economic development.

PROGRAM OBJECTIVES AND APPROACH

The objective of the Chicago District's program was to provide a framework by which the public could actively participate in the study effort. This meant working directly with the various interest groups that comprise the public and surfacing all their concerns during the plan-formulation process. By bringing all issues into focus early in the planning process, it afforded the planners a greater opportunity to resolve the issues concurrent with the selective screening and refinement of the alternative plans.

Accordingly, a method was needed whereby effective communications could be maintained between the planner and the public. A procedure also was needed to facilitate the exchange of information and viewpoints at each stage of the planning process. Both of these needed to be conducted within the context of "fishbowl" planning to insure that the study was highly visible to all interested parties and that concerned citizens could be involved from the beginning.

To obtain a cross-section of the public's viewpoints and encourage a free exchange of information and suggestions, a number of citizens advisory committees were established. These committees represented conservation and civic action groups, local planning and sanitary districts, commerce and industry, and ultimately the agricultural community. Moreover, a steering committee was formed with membership consisting primarily of representatives from those Federal, State and local governmental agencies having a major interest in the technical aspects of wastewater management. These advisory groups supplemented the three sets of meetings held with the general public. Since the study area included all or portions of four counties in Illinois and three counties in Indiana, separate sessions of all three public meetings were held in both states. The first meeting served to advise the area residents of the study's purpose and scope and to determine their viewpoints and concerns. During the second meeting, a range of alternatives capable of achieving the study goals were identified along with an assessment of the related impacts. The purpose of this meeting was to determine the public reactions and comments. A third set not discussed in this Appendix because of the time factor, but rather in Appendix I, Comments, is to be held to determine public reaction to the alternatives retained for final study.

In addition to the foregoing, extensive efforts were made to keep the public informed via the communications media. This involved press briefings, participation in radio and television programs, and meetings with a wide range of organizations.

PROGRAM STRUCTURE

ADVISORY COMMITTEES

Four advisory committees formed the nucleus of this phase of the public involvement program. A fifth involving representatives from the agricultural communities, was added later when those sites concerned with land treatment and sludge management were more definatively known. Each was established as an autonomous entity in order to insure an independence in the review and the subsequent feedback of advise and comments. Thus while each committee served in an advisory capacity and participated in the planning and screening processes, each committee was uniquely capable of providing input and advise specific to its own interests and concern. The membership of each committee was voluntary and left to the discretion of the participants who also were responsible for the conduct and degree of input eventually provided.

Membership on a Steering Committee consisted primarily of key governmental agencies in the study area concerned with water resources management. Involved were such agencies as the Metropolitan Sanitary District of Greater Chicago, Lake-Porter County Regional Transportation and Planning Commission, Northeastern Illinois Planning Commission, the U.S. Environmental Protection Agency, Indiana Stream Pollution Control Board, Illinois Environmental Protection Agency, Indiana Department of Public Health, Indiana Department of Natural Resources, and the Illinois Natural Resources Board which included membership of all state agencies concerned with water and land related developments. Emphasis was placed on assuring that the results of this study incorporated the current and future planning concerns of these and other agencies. Comments and suggestions were solicited as to the technical aspects of design and the data base. Included in the latter aspect were such matters as the amount of storm water that needed to be captured; acceptability of projected wastewater flow, population, and land use projections; and the technical viability of attaining the higher water quality standards.

Participation on the Commerce and Industry Committee was extended to representatives from the major commercial and industrial entities in the study area, particularly those directly or indirectly involved with water and land usage. Committee assistance was sought in projecting trends in industrial and commercial water usage and recycling, on-site waste treatment, sludge disposal, and the economics implicit therein. A cross-section of the organizations who participated included such industrial groups as Mid-West Coal Producers Institute, Inc. and the Illinois Association of Aggregate Producers and individual corporations representing the area's utilities, steel and petroleum manufacturers, and the chemical, drug and food industries.

A Committee for Local Planning Organizations and Sanitary Districts was established to coordinate with those organizations that were directly involved with wastewater management and would be affected by any regionalization of the current wastewater management system. The committee was looked to for providing institutional data regarding current collection and treatment systems and the associated operating costs; help in determining the implications that alternatives would have on local wastewater treatment strategies (present and future); and assistance in assessing the "state of the art" for advanced waste treatment technology and costs. Membership included such organizations as the Gary Sanitary District, Illinois Association of Sanitary Districts, Lake County (Illinois) Planning Commission, Hinsdale and Wheaton Sanitary Districts, and the Cook County Council of Governments.

The Conservation and Environmental Committee was composed of citizens concerned primarily with conservational practices, recreational opportunities, and the overall enhancement of the environment. Input from the committee was needed in order to help identify the environmental problems in the area; assist in multiobjective planning; help assess the environmental impacts

of alternatives; and provide specific input to a prototype study concerning the conservation and/or restoration of the area's natural resources. Participants included representatives from such groups as the Lake Michigan Federation, Cook County Clean Streams Committee, League of Women Voters, Audubon Society, Committee on Lake Michigan Pollution, and Illinois Wildlife Association.

Steps were taken to establish three agricultural work groups during the intermediate stage of study. As previously indicated, information was delayed until the array of sites for both the treatment and sludge disposal areas could be screened and better assessed. This assured that the ensuing coordination would be limited to only those areas warranting further study. The groups were formed to help determine the reaction of the people in those areas where large blocks of land would be committed to specific but multiple usage; and to help resolve any issues or concerns relative to integrating these land-use functions into the life-style of the agricultural community. Workgroups were established in the three basic geographical areas involving the land treatment sites; one in Indiana and two in Illinois. Participants included key agronomists in the areas, Federal, State and local agricultural agents, as well as representatives from local county soil and water conservation districts, county boards, and key local organizations. The conduct of all three work groups was the same but the responses and concerns were quite different. A briefing was given on a paper entitled "The Use of Land as a Method of Treating Wastewater (Its Meaning to the Agricultural Community)", which was provided to participants prior to the meetings. The paper explained the design concepts of the land treatment system and illustratively demonstrated how the system could be integrated into the agricultural area and effectively operated if implemented. A question, answer and discussion period followed each presentation.

The functional procedure was basically the same for each advisory committee. Each selected its own chairman except for the Steering Committee and Agricultural Workgroups which were chaired by the Chicago District Engineer. The size and scope of the membership was left to the discretion of the committee membership. For the most part, the role of the Corps was essentially confined to providing information to the committee and answering questions regarding the data under consideration at that particular stage of the study. Material was provided prior to the meetings when a slide briefing was given by the Corps, followed by both a question and answer and committee discussion period. The material was furnished in the form of reports keyed to the presentations. These reports provided the participants the basic vehicle for written information on the study developments. Background information reports, handouts, and other information were provided or developed in response to committee needs. Although the committees were to maintain individual committee minutes, this task soon became too burdensome and was subsequently assumed by the Corps.

The workability of this procedure was strained by the large amount of information provided during the comparatively short time frame of the study. Consequently "ad hoc" groups evolved within the Steering, Conservation and Environmental, and Commerce and Industry Committees. These developed as a partial response to the situation; particularly when specific data was required as input to the study effort. However, even under these conditions, each committee was able to function, although in a constrained capacity, by providing continuous review and comment on study developments; and furnishing input data either in report form or working with personnel from the Corps and its consultants.

The functional relationship between committees is illustrated on Figure H-1. The chairman of each committee was extended the opportunity to attend the other committee meetings. Additionally the minutes of all committee meetings were furnished the individual chairman. Both of these actions were intended to facilitate inter-committee action and assist in keeping all advised of the various concerns as they surfaced.

PUBLIC MEETINGS

The public meetings not only provided the opportunity to keep the area's residents informed of the study's scope and status; but, as time progressed, to obtain their reaction to various alternatives under study. Three sets of meetings were scheduled to be held during the course of the study. During the initial public meeting the scope of study was outlined; the need for involvement stressed; and an explanation given as to how the planning service offered by this study could be of use to the local governmental agencies and area residents. At the second set of meetings a range of alternative plans were presented. The presentation involved sufficient level of detail to let the various segments of the public see how they may be affected. A third set of meetings, similar but in more detail to the second, will be held once the study effort has been completed. Information on these latter meetings is reported in Appendix I.

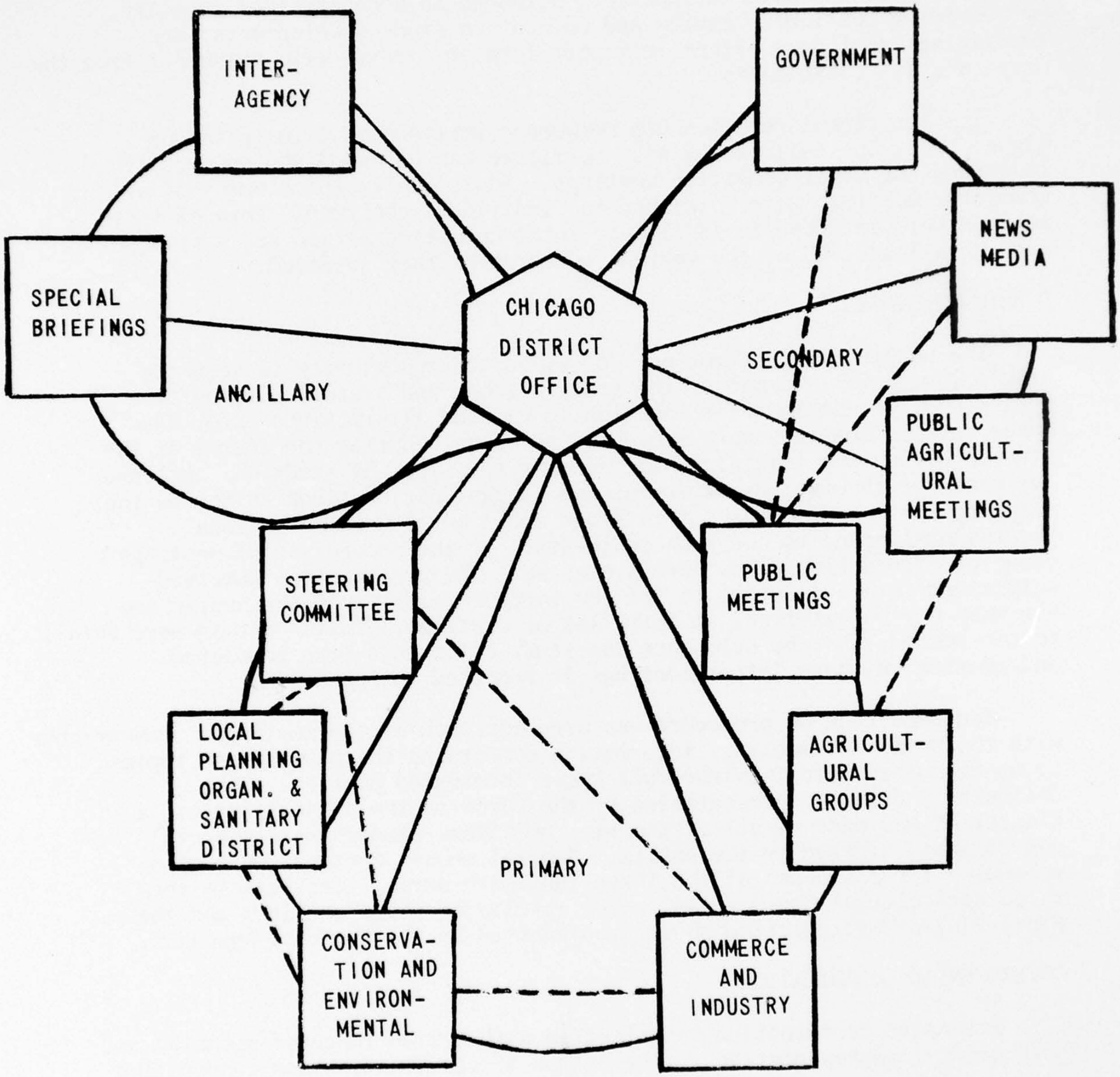
The same type of procedure was used for each of the meetings. Concurrent with the notice of meeting, information concerning the purpose and topics to be discussed were furnished all known interested parties. Then following a detailed presentation by the Corps on the subject topics, a transcript was made of all statements, questions (and answers thereto) and comments offered by the public. Special public meetings were also scheduled for residents of the three land site areas (identical to the three Agricultural Group areas). The results of these meetings and the Final Public Meeting cited above are reported in the Comments Appendix.

GOVERNMENTAL COORDINATION

Extensive coordination was affected with a wide range of agencies and governmental representatives. The degree of coordination and cooperation

FIGURE H-1

INTERRELATIONSHIP OF PUBLIC PARTICIPATION PROGRAM



varied considerably depending upon the interest and manpower capability of the particular agency. The purpose was to inform, exchange information, and obtain assistance in special study areas. Interagency cooperation involved all levels of government and included those entities concerned with the planning, implementation, and operation of not only wastewater mangement systems but also other water and related land development programs.

Briefings for legislators at both the state and Federal level were held as part of the program, but only in response to specific invitations. Similarly, the governors and their staffs from both Illinois and Indiana were briefed on the study. Briefings for local government, for example mayors and town boards, were also held in response to requests.

MEDIA COVERAGE

News briefings held prior to public meetings and at other key points in the study constituted the base of news media coverage. The purpose was to publicize the study and the public meetings in order to obtain as wide a public contact as was possible. The news briefings were supplemented by news releases and other special informational material.

The local communication media also provided television and radio coverage on special discussion shows, regular news programs, and at news briefings. Newspaper coverage included articles publicizing public meetings, editorials, letters to the editor, and series of articles on the study. District personnel discussed many aspects of the study with journalists and provided further information to assist the news media and thereby enhance news coverage.

SPECIAL BRIEFINGS

The public involvement/participation program was additionally supplemented by briefings for special interest groups. Such briefings were in response to invitation. The majority of these meetings were confined to: (1) outlining the purpose and progress of the study, (2) answering specific questions and concerns and (3) providing an educational background of the various study aspects. The American Society of Civil Engineers at Notre Dame, the Cook County Clean Streams Committee, and the North Newton School Corporation are representative of the type of organizations that were given special briefings.

PROGRAM SEQUENCE

The public involvement program was divided into six stages to coincide with the technical studies and the supplemental socio-environmental and institutional evaluations. In each of the study stages shown in Figure H-2, some form of public input was involved. A cross-section of the public meetings

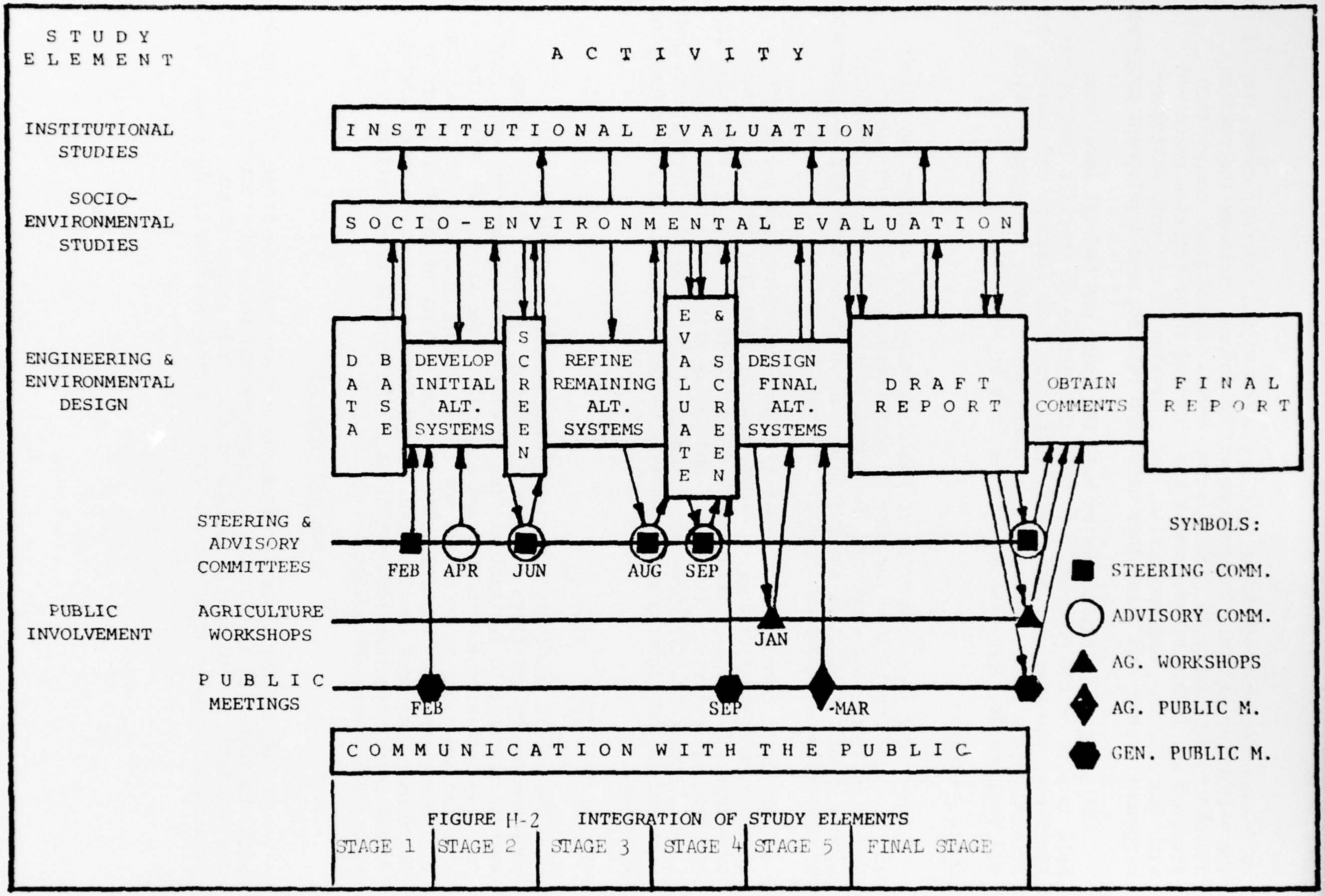


FIGURE H-2 INTEGRATION OF STUDY ELEMENTS

held during the first five stages of study is shown in Figure H-3. Similarly Figure H-4 shows the basic report material provided the public. The public events in each of the first five stages were completed coincidentally with the study effort.

A more detailed explanation of each stage is presented in the following text. Each constitutes a compilation of the major documents and comments produced during the stages of study. A more detailed discussion of the study process is provided in Appendix C, Plan Formulation Appendix.

STAGE 1 - INITIATION OF STUDY

Public involvement in the study began with the initial public meetings held in Chicago on 29 February 1972 and in Gary on 7 March 1972, for Illinois and Indiana residents, respectively. Background information, and the purpose and scope of study was presented to approximately 40 attendees at the Illinois meeting and 60 at the Indiana meeting. The study objectives, the conduct of the study and related questions and answers were other topics discussed at the meetings. Only a few prepared statements were received and, each meeting was relatively brief, with little controversy.

Early in the planning study four separate groups of individuals, believed to be interested in some aspect(s) of a regional wastewater management planning study (environmental, institutional, industrial, governmental, etc.) were invited to meet with the District Engineer to discuss the C-SELM study. From each group a study advisory committee was formed. Each committee was briefed as to the study objectives; the authority, scope, and planning approach, and conduct of the study; the need for public involvement; and the hoped-for functions of the respective committees. Progress Report No. 1 was provided to illustrate study concepts and the tentative framework to be used in developing the initial alternatives for managing the area's wastewater. The Chicago District developed the conceptual framework for selecting the 19 initial alternatives by using a basic "decision-making matrix" and information from the advisory committees, governmental agencies, and other organizations.

Special input during Stage 1 included completion of an Industrial Inventory and Needs Assessment by member organizations of the Commerce and Industry Committee, and preparation of a Conservation Inventory and Needs Questionnaire by members of the Conservation and Environmental Committee. This latter item was an important factor in the eventual development of a Prototype Resource Development Model during Stage 2.

STAGE 2 - INITIAL ALTERNATIVES

Each Advisory Committee (except for the Steering Committee) met for a two part meeting during this stage. At the first meeting, all members were briefed on the study's status and the development of the initial 19 alternatives outlined in Progress Report No. 2. The rationale for

ATTACHMENT H-3

Date	Meeting Held For	Type Meeting
3 Jan	Lake Porter Co. Reg. Plan. Commission	brief on approach
7 Jan	Northeastern Ill. Plan. Commission	brief, exchange info
14 Jan	U. S. Environmental Protection Agency	brief on approach
2 Feb	Ill. Off. Business & Economic Develop.	brief on approach
17 Feb	USDI, Bureau Sport Fisheries & Wildlife	brief on resource develop
28 Feb	USDI, National Park Service	brief on resource develop
29 Feb	Public Meeting Illinois	initial
7 Mar	Public Meeting Indiana	initial
9 Mar	Federal Power Commission	exchange info
10 Mar-31 Mar	14 Park Districts	Re: Resource Develop
17 Mar	Ill. Natural Resources Development Bd.	initial brief
Mar	USDI, Bureau of Mines	brief
Mar	Ill. Assn. Sanitary Districts	disposal sites
22 Mar	Ind. Depart. Natural Resources	recreat brief
11 Apr	Cook Co. Clean Streams Committee	initial brief
12 Apr	U. S. Depart. Housing & Urban Develop.	initial brief
12 Apr-(19 Sep)	Steering & 3 Advisory Committees	20 coordination brief
18 May	USDA, Soil Conservation Service	Agric. brief
1 Jun	USDA, Soil Conservation Service	Agric. brief
5 Jun	Petroleum Refining Industries	Exchange info
13 Jun	USDA, Soil Conservation Service	Agric. Brief
15 Jun	USDA, SCS River Basin Staff	Agric. Brief
13 Jul-31 Aug	Park Districts along North Branch	Coor. on North Br. Res. Dev. Plan.
31 Aug		
18 Jul	Ill. Dept. Busin. Econ. Devel., Ind. Dept. Natural Resources, Bureau Sports, Fish & Wild, Lake Porter Comm., NIPC, BOR	Coordin on North Br. Res. Develop. Plan.
20 Jul	U. S. Dept. Housing & Urban Development	Coordin on North Br. Res. Develop. Plan.
20 Jul	USDI, Bureau Outdoor Recreat, USD Housing Urban Level	Coordin on North Br. Res. Develop. Plan.
21 Jul	NIPC, Commonwealth Edison	Coordin on North Br. Res. Develop. Plan.
21 Jul	Commonwealth Edison	Coordin on North Br. Res. Develop. Plan.
2 Aug	Ill. EPA, Ill. Off. BED, USEPA, MSDGC	Tech Discussion of Plans
4 Aug	Ind. State Bd. Health, SPCB, DNR, Lake Porter Comm.	Tech Discussion of Plans
23 Aug	Northern Ind. Public Service Company	Coor on North Br. Res Dev Plan
31 Aug	Ill. Dept. Agric, Coop Extension Service, SCS	estab Agric Committee

8 Sep	Federal Power Commission	brief on synergisms
14 Sep	Public Meeting Indiana	Plan Formulation
18 Sep	Public Meeting Illinois	Plan Formulation
18 Sep	Cooperative Extension Service	Agric brief
26 Sep	Indiana Congressional Delegation	info brief
2 Oct	North Newton School Corp	info brief
15 Oct	Public Broadcast, Chicago at Large	TV program
3 Dec	"The Jim Conway Show", WNUS	Radio talk show
7 Jan	"Pinpoint", WLS	Radio talk show
8 Jan	"Agricultural" Public Meeting- Joliet	Discussion of "Ag" issues
9 Jan	"Agricultural" Public Meeting- DeMotte	Discussion of "Ag" issues
10 Jan	"Agricultural" Public Meeting- Crystal Lake	Discussion of "Ag" issues
11 Jan	Newton County S&WCD	briefing at annual meeting
15 Jan	Ind House Comm. on Pub. Health & Envir. Aff.	testimony on legislation
19 Jan	WLCL Radio	Discussion on radio show
22 Jan	Kankakee Area Audubon Society	study briefing
26 Jan	WRIN Radio	public broadcast forum
5 Feb	WCSJ Radio, Norman McDonald host	study discussion
18 Feb	"City Desk" TV Program	panel discussion
21 Feb	Soil Conservation Service	briefing on SCS study
27 Feb	Ill. Gov. Walker & Agency heads	study briefing
28 Feb	Chicago Department of Envir. Control	study briefing

ATTACHMENT H-4

MATERIAL PROVIDED THE PUBLIC

Appx. Date	Distribution*	Document
7 Feb	(1)	Notice of Initial Public Meeting
12 Apr	(1)	Environmental Questionnaire
18 Apr	(2)	Industrial Inventory Questionnaire
3 Jun	(4)	Plan Formulation Rationale; Progress Report No. 1
Continuous	(2)	Summaries of Committee Meetings (4 Reports for each Committee)
Jun	(3)	OCE Special Study
14 Jun	(4)	Progress Report No. 2
19 Jun	(3)	Phase I, U. of Washington, Penn State, CRREL Reports
14 Aug	(4)	Progress Report No. 3; Technological Issues; Socio-Environmental Impact Analysis Methodology; North Br. Chicago River Resource Development Plan; key visual aids from presentation
20 Aug	(1)	Notice of Plan Formulation Public Meeting
29 Aug	(1)	"Water" Brochure
29 Aug	(2)	Answers to 21 Questions from C & E Committee
12 Sep	(4)	Addenum to Progress Report No. 3
13 Sep	(2)	Human Factors Weights--Form Completed
19 Sep	(5)	News Release--Final Alternatives to be Studied
21 Dec	(4)	"The Use of Land as a Method of Treating Wastewater"
5 Jan	(6)	Response (to critique of "Ag" paper) by Dr. Harry Galloway
Mar	(6)	Summary of Agricultural Group Meetings

*Key: (1) Public (includes agencies and committees)
(2) Applicable Advisory Committee
(3) Steering Committee and Chairman of Advisory Committees
(4) All committee members and interested Governmental Agencies
(5) News Media
(6) Agricultural Groups

development of alternatives and a descriptive analysis of each was presented at the meetings, along with a cost comparison between alternatives. Also included in the briefings was a discussion of the potential for multi-objective planning through the use of "add on" options such as cooling ponds for power plants, power generation and water reuse.

Subsequent to the first briefing, follow-up meetings were held with the Advisory Committees to further discuss the study results in Progress Report No. 2. At that time all viewpoints concerning the initial alternatives were solicited with a view to determine the positive and negative aspects of each system. Subsequently the views of the other committees were discussed with the Steering Committee at a meeting that covered the same purpose and material as the two part advisory committee meetings. Shortly thereafter, the Chicago District reduced the number of alternatives for further study. Comments and recommendations of all committees were considered in the selection of the subsequent 11 alternatives.

An Ad-Hoc subcommittee of the Conservation and Environmental Committee provided invaluable assistance in distributing and completing the Conservation Inventory and Needs questionnaire mentioned earlier. The questionnaires were used in the development of a North Branch Chicago River Prototype Model. To aid in development of the prototype, meetings were also held with representatives from several communities, the Park Districts and Forest Preserves located along the North Branch of the Chicago River, and with conservation and recreational agencies of the States and the U.S. Department of the Interior. The "add on" option exemplified by the Prototype Model was cited as an example of the type of multiobjective planning possible. The intent was to show how recreational and environmental benefits could be incorporated into the design of regional wastewater management systems. The fact that some of the wastewater management systems automatically provided significant flood reductions and low-flow augmentation, meant that the use of the flood plain could be easily redirected to meet other priority needs.

STAGE 3 - INTERMEDIATE ALTERNATIVES

During the third stage, briefings for interested agencies were continued. Individual discussions on various resource implications associated with the different technologies were held with selected industries such as the power and natural gas companies.

Technical members of the Steering Committee also met on an ad hoc basis in both Chicago and Indiana to discuss the design considerations of the alternatives. Discussion and output from these meetings centered on the viability of the wastewater treatment technologies, the alternatives' functional components and the higher water quality standards addressed by the study. Representatives of the principle water resource management and planning agencies also participated in the discussions.

Similar "ad hoc" factions of the Commerce and Industry Committee also met in a number of meetings to help provide required data for the study. Committee representatives of the steel, petroleum, aggregate and coal producing industries provided information concerning: future trends in

industrial recycle of wastewater, the use potential of mined rock, and the location and availability of strip-mined areas for the disposal of residual sludge.

The four Advisory Committees convened for the third time and were briefed on four new study items. These were: (1) the procedure developed by an independent group of academicians contracted by the Chicago District to assess the socio-environmental impacts of each alternative, (2) a draft of the North Branch Chicago River Prototype study, (3) an institutional factors report that characterized a cross-section of agencies involved in the management of the area's wastewater and resource developments, and (4) Technical Progress Report No. 3 that presented details on the 11 alternatives previously selected. Technological Issues, a paper prepared mainly as feedback to questions raised at past group meetings, was also presented at the meetings. Similarly, a response to 21 questions from the Conservation and Environmental Committee was provided during this stage. This information was provided as input primary to help committee members in their consideration prior to meetings in the next stage of the study. During this next stage the 11 alternatives were to be screened to a lesser number.

STAGE 4 - SELECTION OF FINAL ALTERNATIVES

The plan-formulation public meetings were held in September 1972 in Hammond, Indiana and Chicago, Illinois. An informational brochure was mailed to all known interested parties. This brochure described the 11 alternatives; summarized the potential social, economic and resource implications; and solicited the viewpoints and reaction of the public. A number of the 1200 in attendance at the Indiana meeting also were included in the 200 who attended the Illinois Meeting. These people were residents from those land treatment sites in Indiana which were under consideration at that time. The people expressed opposition to the concept of the land treatment system and specifically the use of Indiana farmland to treat the wastewater of the Chicago Metropolitan area. Moreover the operation and acquisition program included in the system design was regarded as too disruptive to the agricultural community and its life-style.

The fourth set of committee meetings were also held. At these meetings the Corps presented the basic guidelines and planning considerations used to screen the 11 alternatives and select the five that warranted retention for final study. The selection was discussed with each committee and reviewed with regards to the concerns and recommendations of socio-environmental evaluators. Two of the committees completed a "Human Factors Weights" form identical to the form employed by the environmental evaluation team in its efforts to assess impacts attributable to the alternatives. The form reflected a value judgement as to how changes in a wastewater management system would affect the social and ecological environment. A comparison of the Committee "weights" to those given by the evaluation team was made to provide insight into how the relative values on socio-economic factors would affect the comparison of alternatives. Steering Committee members and chairmen of the Advisory Committees were also provided copies of three reports on the application of wastewater to the land. The reports were provided to serve as background material and as a further basis for screening the eleven alternatives.

On 19 September 1972, the selection of the five alternatives was publicized in a news release. The five alternatives were retained for more detailed design and evaluation. The District Engineer gave an extensive number of briefings on these five alternatives including one to an Indiana Congressional Delegation in Washington, D.C. The latter briefing was requested in response to the negative reaction by the Indiana people who resided in the land treatment sites. On a ten-minute segment of the WGN-TV program "Chicago at Large", the District Engineer was afforded additional opportunity to present the study to the public. Also throughout this stage, many editorials and articles appeared in local newspapers, generally in regard to the land system alternatives.

STAGE 5 - AGRICULTURAL DEVELOPMENTS

Early in Stage 5, the planning and design criteria for the land treatment sites were extensively revised. The necessity for change was the direct result of the social and environmental concerns expressed by both the evaluation team and the people residing in the agricultural areas. The major change involved modifying the physical layout of the treatment facilities to fit into the general land-use patterns of the surrounding area. To do this meant: avoiding disruption to eco-unique areas, communities, commercial developments and public institutions; maintaining the integrity of the area's transportation system; and effectively co-locating with the participating farmers. All of these planning criteria were required to minimize any possible effects on the areas' social well-being, economic structure, and environmental attributes. The results of these and other changes in the system's operation and management were incorporated in a paper entitled "The Use of Land As A Method of Treating Wastewater (Its Meaning to the Agricultural Community)". The agricultural paper was developed in part through a series of meetings during late September through early December 1972. Meetings were held with Federal and State agricultural agencies and various agricultural experts, including representatives of state universities and local agronomists. Much independent literature research was performed by the Chicago District and utilized in development of the paper.

A draft of the agricultural paper was presented at a series of special meetings held in October and November as part of an extensive review process. Subsequently a critique of the paper was written by Dr. Harry Galloway from the Purdue University (Indiana) Cooperative Extension Service. The questions raised by Dr. Galloway and answers prepared by the Chicago District are reproduced in Stage V. A critique was also provided by the University of Illinois (Champagne-Urbana) as the result of their participation. At the same time, efforts were made to establish the agricultural work groups and begin extensive coordination with the agricultural communities.

In January 1973, agricultural work group sessions were held for each of the three land site areas under consideration: in Crystal Lake, Illinois

for sites in the McHenry County area; Joliet, Illinois for sites in the Will-Grundy and Kankakee County areas; and DeMotte, Indiana for sites in the Newton-Jasper area. A presentation of the study purpose, scope, and status was given. The focus of the meeting was the Agricultural Paper, which served as a basis for discussion. Particular emphasis was given to matters relating to those aspects of the study which involved the land treatment technology and which could affect the agricultural community. Comments and recommendations of the meeting participants were ultimately utilized to revise the agricultural paper. At the same time the concerns expressed at these meetings were used as input to a series of four public meetings held in the agricultural areas during the middle of April and first of May 1973. The purpose of those meetings was to determine the public reaction to the changes in the land system design. The results were the same as that experienced before, reflecting an adamancy not to commit their resources to meet the needs of another area.

ANALYSIS OF PROGRAM EFFECTIVENESS

Many significant factors affected the effectiveness of the public involvement program. A basic factor was the total unfamiliarity which the average citizen had in relation to the basic subject of wastewater management. This complicated the efforts of both the participants in trying to keep abreast of the study and the Chicago District's efforts to keep the participants informed of the study's findings. A second and related factor was the necessity to develop and provide more detail than originally anticipated as part of a continuous educational (briefing) process. The large amount of information provided the participants in response to these factors led, in turn, to an attitude of first, frustration and later apathy on the part of many advisory committee members. Contributing to this aspect was the necessity to respond to the complex issues under study without adequate time to study the issues. This latter factor resulted from the compressed time schedule in which the study was undertaken. Other factors affecting the effectiveness of the program also surfaced during the early study stages. These included: an attitude that the study was an academic exercise in planning; and the concern that participation might be erroneously interpreted as approval of the study. While both of these reactions were somewhat dispelled by the enactment of the Federal Water Pollution Control Act Amendments of 1972, they did affect the degree and extent of an individual's participation.

As a result of the foregoing, actual participation soon evolved into two basic forms: "ad-hoc" subcommittee which, as discussed earlier, involved specific individuals working with personnel from the Corps or its consultants on special study-related matters; and a minimum level of committee membership. Even so, the interaction between committees was notable; although not as much as desired. Moreover, significant study input was obtained by maintaining direct contact with the individual committee members.

Of particular pertinence was the fact that the study in itself involved highly technical matters. Thus of necessity, the presentations tended to be technical in content and turned potential public interest to apathy. While study emphasis was given the social and environmental aspects, they soon became secondary in the discussions with the public. Even the reaction from the residents in the agricultural areas followed the same pattern of focusing on technical issues. Thus there was considerable misunderstanding on the part of the public extending even to the purpose and objectives of the study.

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

STAGE I: INITIATION OF STUDY

The material presented herein is a summary of the interaction with the public during the initial stage of study. As such, the material is presented in three main parts as follows:

Part 1 - Summany of the Initial Public Meetings
Part 2 - Initial Citizens Advisory Committee Meeting Summaries
Part 3 - Steering Committee No. 1, Minutes of Meeting

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

STAGE I - PART 1

INITIAL PUBLIC MEETINGS
(Summary)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

PREFACE

The U. S. Army Corps of Engineers, Chicago District, conducted an initial series of Public Meetings concerning its wastewater management study for the Chicago-South End of Lake Michigan Area.

Two meetings were held. The first was held on 29 February 1972 in the Everett M. Dirksen Room, Dirksen Building, 219 South Dearborn Street, Chicago, primarily for the residents and interested organizations of Illinois. The second meeting was held on 7 March 1972, Room 93, Main Building, Indiana University Northwest, Gary, primarily for the residents and interested organizations of Indiana. A list of those to whom a notice was sent is on file in the Chicago District.

The results of the two meetings are summarized herein. The first section summarizes the presentation given by the Chicago District at both meetings. The second and third sections summarize the written and verbal testimony received at each of the two meetings.

TABLE OF CONTENTS

SECTION I - CORPS OF ENGINEERS' PRESENTATION

BACKGROUND INFORMATION

After the introductory remarks, Colonel Wells, Chicago District Engineer, requested that the questionnaires included with the Public Notice be completed and returned. The purpose of the questionnaire was to determine the range of problems or needs in the study area, the types of programs the public wanted implemented to solve the problems, and the type of public participation program of most interest to the residents. The questionnaire and a summary of results are attached (Attachment I-1 and I-2, respectively) at the conclusion of this section.

The Congressional resolutions from both the House and Senate Public Works Committees which authorized the study were cited. Copies of the resolutions are on file in the Chicago District Office. The study area, which includes portions of four Illinois and three Indiana counties, was then outlined (See map, Attachment I-3). Some 7.2 million people reside within this study area. The surface runoff drains either into the Des Plaines River or Lake Michigan.

PURPOSE AND SCOPE

This study will differ from on-going State and local efforts in that it will: first, evaluate wastewater management solutions on a regional basis, unconstrained by State boundaries; and second, be responsive to the "No Discharge of Critical Pollutants" standards being contemplated in legislation currently under consideration by Congress.

The study will begin by identifying the existing State and local plans for achieving current water quality standards (Reference Base).

Next, using the Reference Base as a starting point, the study will cost and evaluate a series of alternative systems which are compatible with meeting the area's needs for the year 2020. Design emphasis, however, will be placed on that part of the system required to meet 1990 needs. The alternatives will be formulated to meet either the current water quality standards or the higher standard being considered by Congress. In addition, the alternatives will be developed to achieve economies of scale (regionalization) and an effective reuse of the treated water and related land resources. Then, the optimum plan for achieving current standards will be identified and used as a <u>Screening Base</u> in later comparisons to the higher standard.

Finally, the study will detail the two or three most effective alternatives with the technical goal of approaching no discharge of critical pollutants. As indicated, regionalization and resource reuse will be considered.

RESULTS OF STUDY

The study results should assist the States, local agencies, and the public in at least three ways.

First, development of the Screening Base may identify opportunities for improvement in current plans for meeting existing standards and show how such improvements could be made without adverse impact on the on-going programs.

Second, the study will identify the best plan(s) for achieving the higher standards in the event they become Federal law. Then, the applicable costs and tangible and intangible benefits will be compared to those of the Screening Base (current standards). The differences in environmental, social, and economic considerations will be evaluated to facilitate public understanding.

Finally, the study may display technology not previously considered in State or local planning which could be used to advantage, regardless of the water quality standard finally adopted.

STUDY GUIDELINES

The following guidelines will be followed during the course of the study. The study will be undertaken as a service to the State and local governments, with no intention of pre-empting their responsibilities. Therefore, every effort will be made to insure that there is no disruption to the on-going planning, construction, and enforcement programs. To do this, all alternatives will use as a common building block, those systems and facilities either completed, under construction, or expected to be in the advanced planning stage by July 1973.

Federal Environmental Protection Agency Guidelines will be followed to the maximum extent possible to ensure that the alternatives which evolve are suitable for implementation.

Furthermore, the study will be carried out in a "Fishbowl" type of atmosphere with maximum opportunity for input and participation by Federal, State, and local agencies, citizen interest groups, and private citizens.

A full range of alternatives will be considered with no pre-commitment to any specific wastewater collection, treatment, or disposal method. Each system will be designed to collect and treat all sources of pollution, including municipal, industrial, and stormwater flows. Treatment and disposal of all solids, liquids, and gaseous waste products will be followed through to their ultimate fate or destination, as part of the system's performance evaluation.

STUDY FRAMEWORK

The approach to be used in the conduct of the study is shown in Attachment I-4. The technical studies (including water reuse and conservation programs) will move through three district stages as shown on the main baseline (series of boxes on attachment). Subsequent to completion of the data base, which is nearing completion, a full array of alternatives will be generated for consideration. These alternatives will be formulated to meet the needs of the year 2020, thereby establishing a long-range study framework.

Next, the alternatives will be reduced in number by an evaluation/assessment/ screening process. Those alternatives retained will then be refined, with system design restricted to that part of the plan which should be operational by the year 1990.

Finally, after a second screening analysis, the remaining alternatives will be designed and evaluated in detail for presentation in a draft report. The draft report will then be distributed for comment to all interested governmental agencies and citizen groups; the comments will be incorporated and included as part of the final report.

Concurrent with the technical work, a second part of the study team will assess the socio-economic and environmental impacts implicit in each alternative, while a third team will identify the inherent institutional changes and problems. A free exchange of information and suggestions for modification will be maintained throughout the study, as indicated by the arrows on the attachment.

To obtain a cross-section of ideas from the public, we hope to establish various citizen advisory committees representing different viewpoints. These committees, representing conservation and civic action groups, local planning and sanitary districts, and commerce and industry, will conduct their own workshops and actively participate in the plan-formulation and review processes. A farm committee will be formed at a later date. In addition, we will have a steering committee comprised of representatives of Federal, State, and local governmental agencies having a major interest in the technical aspects of wastewater management.

Three sets of formal public meetings will also be held, of which these are the first. During the second set of meetings we will describe the alternatives which were studied, screened and refined, and ask your ideas as to what plans and variations should be considered for final design. At the last public meetings we will describe our findings and obtain your comments and recommendations which will be included in the final report.

This concluded the Corps' presentation and the meetings were opened to receive verbal and written comments including questions concerning the study.

QUESTIONNAIRE

C-SELM WASTEWATER MANAGEMENT STUDY

TO BETTER UNDERSTAND THE NEEDS AND WISHES OF THE PEOPLE IN THE CHICAGO-SOUTH END OF LAKE MICHIGAN AREA, AND IMPROVE OUR PLANNING AND INFORMATION PROCESS, WE NEED MORE FACTS AND IDEAS. WE WOULD APPRECIATE HAVING YOUR COMMENTS ON THE FOLLOWING QUESTIONS.

1. Please print your name, address and the organization (if any), that you represent.

____
____
____ (OPTIONAL)
____

2. Mark on the scale below the importance, in your opinion, of the following problems or needs in your area.

Not a Real Problem	Moderate Problem	Serious Problem	Very Critical Problem	
( )	( )	( )	( )	Water quality (stream pollution from municipal discharges)
( )	( )	( )	( )	Water quality (stream pollution from industrial discharges)
( )	( )	( )	( )	Conservation of fish & wildlife habitats
( )	( )	( )	( )	Preservation of Natural settings & historical sites
( )	( )	( )	( )	Lake & river erosion & sedimentation
( )	( )	( )	( )	Flooding
( )	( )	( )	( )	Water supply
( )	( )	( )	( )	Recreation
( )	( )	( )	( )	Other ____________

3. Where are the more serious water related problems or needs located?

	PROBLEM OR NEED	LOCATION
A.		
B.		
C.		
D.		

4. What types of programs would you like to see implemented to correct the problem areas you've selected?

5. What types of public involvement would you think helpful in defining and dealing with the problems? (e.g., seminars, workshops, etc.)

6. Occupation ________________________________. (OPTIONAL)

7. Additional Remarks:

WE APPRECIATE YOUR COOPERATION IN COMPLETING THIS QUESTIONNAIRE

Response to Questionnaire

To determine the needs and desires of the public in the Chicago-South End of Lake Michigan area, over 800 questionnaires were circulated both by inclusion in the announcement of public meeting and by distribution at the public meetings. Of these, 36 questionnaires (4 Percent) were completed and returned.

Due to this statistically limited response, it is unreasonable to generalize the overall public attitude on the study area needs. It is worthy to note however that nearly all the responses were from individuals affiliated with conservation, environmental, and citizens action groups. Being familiar with various parts of the study area, these individuals were able to respond specifically to the questionnaire. The quantifiable results and a summary of particular concerns are attached hereto; this information will be input to the plan formulation process described in the meeting summary.

QUESTIONNAIRE RESULTS
INITIAL PUBLIC MEETINGS
C-SELM WASTEWATER MANAGEMENT STUDY

IMPORTANCE OF PROBLEM OR NEED

Problem or Need	Not a Real Problem	Moderate Problem	Serious Problem	Very Critical Problem
Water quality (stream pollution from municipal discharges)	4	4	16	12
Water quality (stream pollution from industrial discharges)	3	5	13	14
Conservation of fish & wildlife habitats	2	6	5	19
Preservation of Natural settings & historical sites	4	8	9	12
Lake & river erosion & sedimentation	4	11	11	8
Flooding	7	10	9	5
Water Supply	12	9	9	3
Recreation	7	7	13	5

LOCATION OF MORE SERIOUS WATER RELATED PROBLEMS OR NEEDS

Seventy-five percent of those responding to the questionnaire completed this section. Of these, 85 percent cited various aspects of water pollution both to Lake Michigan and streams tributary to the Illinois River System. Cited most frequently were the resultant pollution from municipal and industrial discharges due both to improperly operated sewage treatment plants and inadequate facilities. Water supply was a concern of 19 percent of those responding, recreation and wildlife and flooding problems each 15 percent, and erosion control 11 percent. Cited less frequently were needs for the preservation of open space and historical sites, flood plain zoning, low flow augmentation and governmental concerns including the enforcement and strengthening of present water pollution regulations.

IMPLEMENTATION PROGRAMS DESIRED

Enforcement of existing laws and regulations was the most frequent response to this question. Many responders felt enforcement was a priority to precede other programs or laws to be considered.

Hearings in Chicago and passage of the Lake Michigan Bill of Rights was cited as a desired program. Specific programs were suggested at local areas. These included hiking trails, debris and litter removal, upgrading local sewage treatment plants, and implementation of existing projects such as the Metropolitan Sanitary District of Greater Chicago's Deep Tunnel Plan. More general suggestions were also given, including: an environmental impact statement to accompany each application for industrial discharge permits, and subsequent surveillance to ensure continued compliance; elimination of individual septic tank systems in favor of a regional treatment facility; and an incentive program to make it economically advantageous for industry to properly treat its waste.

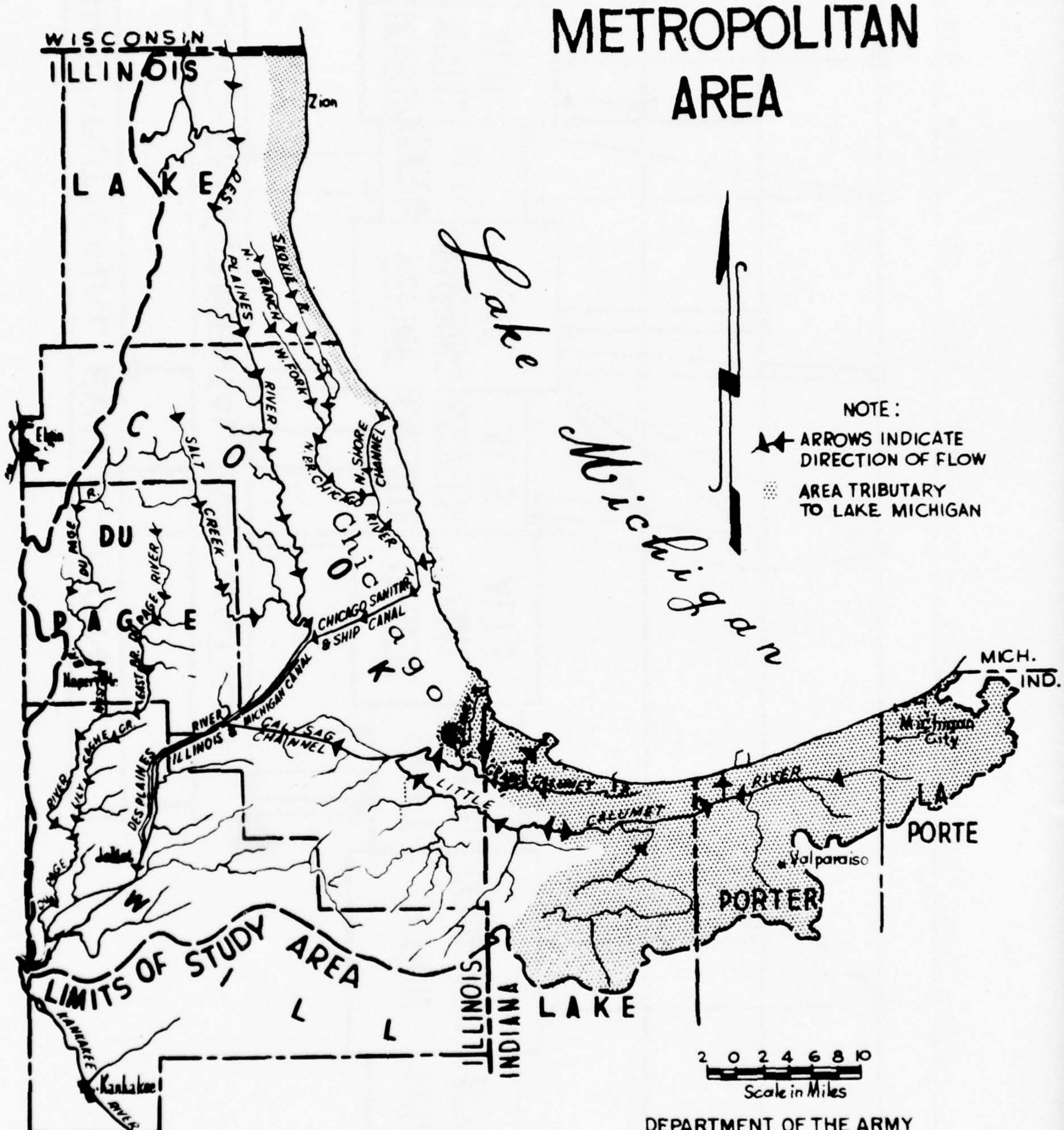
PUBLIC INVOLVEMENT DESIRED

Many responders suggested seminar (workshop) sessions as the basis of public involvement. Public hearings preceding, during, and immediately following studies was an indicated need. Publicity concerning all phases of a study, especially publicity capable of reaching a majority of the public, was a stated necessity. Included in such a program would be more extensive coverage by the news media, speakers at local clubs and organizations, and educational sessions.

ADDITIONAL COMMENTS

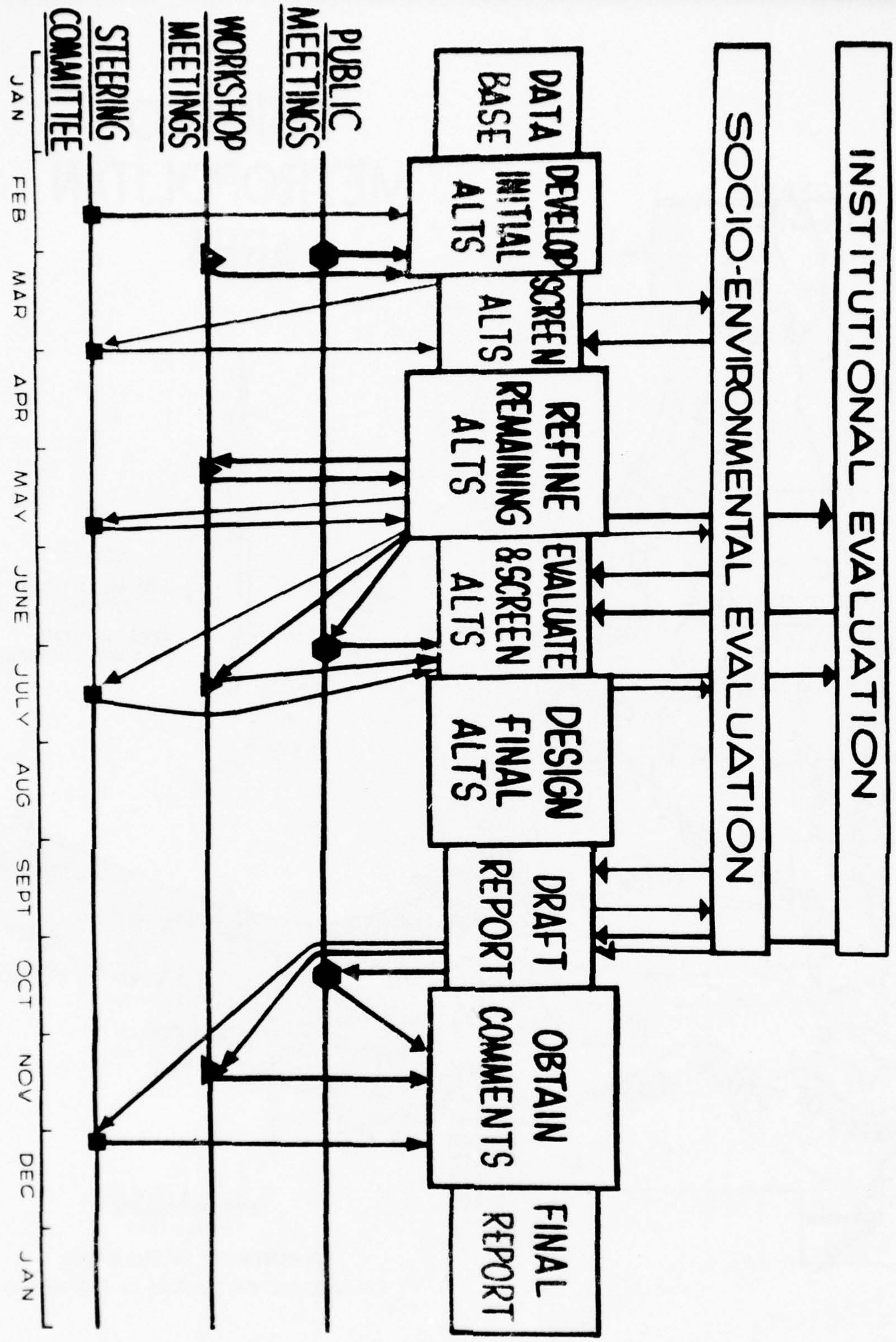
Many of the additional comments were concerns cited in the two previous questions. The response to this question also indicated public agreement both with the present Corps' study and with the Corps effort to seek solutions through a public opinion questionnaire.

CHICAGO METROPOLITAN AREA



DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS

Attachment I-3



Attachment I-4

SECTION II - ILLINOIS PUBLIC MEETING SUMMARY
(Everett M. Dirksen Building, Chicago, Illinois)
29 February 1972

PREPARED STATEMENTS

A letter from Congressman George W. Collins was referenced for inclusion into this record (See Exhibit II-1; also attached for the record is the attendance list).

MR. LYMAN ANFIELD, a member of the Clean Streams Coordinating Committee, presented the first prepared statement at the conclusion of the Corps' briefing. Mr. Anfield read a letter that he forwarded to U. S. Senator Charles H. Percy, which addressed the problems of flood prevention and overflow retention. He suggested the Metropolitan Sanitary District and the Corps work together to provide flood retention ponds in alleviating the problems of flooding and water supply (see Exhibit II-3).

MRS. LEE BOTTS, Executive Secretary of the Lake Michigan Federation, stated reasons for objecting to the C-SELM study. Mrs. Botts'principal contention was that the Corps was not the proper agency to conduct the study, since she felt that the initiative for the study came from the Corps for its own purposes (Mrs. Botts questioned the authorization used to conduct the Feasibility study completed in July 1971, indicating that the authorization was meant to serve a different purpose and hence utilized improperly). Mrs. Botts doubted that the Corps is totally uncommitted to any specific system, feeling the study will be biased towards land disposal by the involvement of Dr. John Sheaffer [Science Advisor, Office of Civil Functions, Department of the Army].

Further, Mrs. Botts questioned the "capacity of the Corps to undertake such a massive planning effort when its function is to build rather than to plan." She went on to state that Congress has authorized the National Academy of Science to undertake a two year study of the feasibility of "no discharge" standards by 1985, and to question the intent by Congress of the present Corps study relative to a duplication of effort. Finally, Mrs. Botts reiterated an earlier contention; she felt the Corps is a construction agency and should not be the planning agency that decides what to build. (See Exhibit II-2 for text of statement).

MR. JAMES PARKER, Co-chairman of the North Branch Coalition, completed the presentation of prepared statements. Mr. Parker expressed particular interest in the North Branch of the Chicago-River, noting the past concern and success of the Coalition in initiating clean-up effort on the North Branch which is, according to Mr. Parker, the second most polluted stream in Illinois. Mr. Parker stated the Coalition's concern for "action now", suggesting conservation interests be given a more active role in the study to promote immediate action. He also indicated favor for the Corps' present study [C-SELM] effort and suggested local interests take advantage of such studies. [Statement not submitted]

Questions and Answers*

Following Mr. Parker's statement, Colonel Wells and members of his staff answered the following questions:

Q: What approach to the wastewater management problem will be used? Who will make the final decision as to which alternative will be utilized?

A: The States have the responsibility to decide what approach to use. They may use the alternatives developed in the Corps study, if they so choose.

Q: Why was the study area cut off at the Wisconsin state line? Did political pressure from Wisconsin interests force such a cutoff?

A: The initial Congressional resolution for the study determined the area to be studied; the area above the Wisconsin state line was excluded. The Corps is, however, cognizant of the flows above this line and of the resultant affects to the study area. Studies are currently being performed in this area and this was a factor in the cutoff decision, not political pressure.

Q: What happens if the States disagree with the study results?

A: We have to produce a product that will sell on its own merits. The Corps is in the unusual situation of planning without having the responsibility for execution.

Q: What is the possibility of funds being channeled to conservation groups? Since we are more concerned with the present quality of water rather than what will happen in 1990 and 2020, what impact will the study have on our concerns?

A: We will get ideas from conservation interests through our workshop meetings; however, we cannot fund these groups because of the fund constraints under which the study is being performed. It must be emphasized that short term results will have to be the concern of State and local governments. We are accepting these short term programs, using them as a base, and proceeding from there. Our study will not interfere with those plans.

Q: What interagency cooperation, as required by the Water Resources Planning Act, is being done, specifically in view of the suggestion by the EPA that the Corps get out of this area? Why is the Corps not working with the Great Lakes Commission? How much will the study cost?

* Q: Question, A: Answer

A: First, as regards cooperation by the EPA, through the latest efforts of Mr. Ruckelshaus, we are now working in close cooperation with the Federal EPA, which has accepted membership on our Steering Committee. Furthermore, we are contacting all Federal and local agencies and the two States to determine their interest and willingness to participate. We are a member of the Great Lakes Basin Commission but as indicated are also working with the members of the Commission on an individual basis. The cost of the study is $830,000.

Q: There appears to be a conflict of interest in having the Corps do this study: how can the Corps be held accountable for ecological concerns? How can it be held accountable to the people?

A: Authorization comes directly from Congress; Congress will let us know if we are doing our job and citizens in turn can inform their Congressmen as to their opinion of our performance. The multiple objectives set forth by the Water Resource Council and adopted by Congress as well as the National Environmental Act of 1969 require that we address the environmental concerns in our planning efforts. The express purpose of this public meetings is to insure that we are producing what the public wants.

Q: In light of Dr. John Sheaffer's role in the Muskie bill, the resultant implications from this association and his involvement with the Corps, will not the study be biased towards Dr. Sheaffer's thinking?

A: The District Engineer receives his directive and mission from Congress and within this context will develop the best plan without prior commitment to any specific method.

Q: How is the funding for the study apportioned?

A: The engineering effort is being done by several agencies, including Bauer Engineering, Inc. Separate evaluation and impact assessment studies will be performed by two consortiums of universities and a group in Washington. Funds will be utilized partially in-house, the remainder by contract.

Q: What State agencies are being coordinated with?

A: Basically, these are the Illinois EPA, Natural Resource Development Board, Metropolitan Sanitary District of Greater Chicago, North Shore Sanitary District, Lake County Planners, and DuPage Public Works and Public Health Departments, etc. Interaction with these groups is through the Steering Committee whereby it is possible to obtain their guidance, request specific data for input and present material for their specific review and comments. A series of alternatives will be presented and comments and suggested modifications will be solicited.

Q: What role does Dr. Sheaffer have in the study? As an officer of Bauer Engineering Incorporated, is this involvement with Bauer and the Corps not a conflict of interest?

A: Dr. Sheaffer is a special assistant to the Secretary of the Army. Bauer Engineering will be directed by Col. Wells, not Dr. Sheaffer, whose role with that firm whatever it might be will not influence the study. [Note: Subsequent followup to this question revealed that the possibility of a conflict of interest had been reviewed by legal counsel when Dr. Sheaffer was hired. It was determined that no conflict of interest existed, since Dr. Sheaffer's role was a consultant, not a staff member of Bauer Engineering, Inc.]

Q: Will Steering Committee meetings be open to the public? How about permitting outsiders (ie, League of Women Voters, etc.) to sit in on these meetings?

A: While it was not our intention to open Steering Committee meetings to the public, we certainly do not preclude such a possibility. The workshop groups have been conceived as distinct from the Steering Committee to allow small enough groups for effective communication. Workshop meetings will parallel Steering Committee meetings.

Q: Are contracts let by competitive bidding?

A: No, with this type of contract we review the capability of firms (a minimum of three) and order them in terms of ability to perform a particular service. Negotiation proceedings are initiated with the first choice and, if an agreement cannot be reached, negotiations pursued with succeeding firms until an agreement is reached.

Q: Will a plan that is "saleable" to the states mean a watered down plan?

A: No, our plan will have to sell on the basis of the fact that it will do the job.

Q: How does the Corps study tie in with prior studies?

A: Everything that has been done will be used as starting, input information. It is not our intention nor do we possess the resources, to redo anything that has been done.

Q: Is the Corps interested in specific recommendations, eg., to run lake water across-state and pump up waters around the Skokie Lagoons to increase the level of the river?

A: Yes, we are interested in this type of idea and will consider this one.

Q: How about lowering the level of the Lake [Michigan], which is high now and washing out the shoreline?

A: This would require action by the U. S. Supreme Court, since a limitation of 3,200 cfs has been set. This amount is monitored by the State.

With no further questions, the meeting was adjourned.

GEORGE W. COLLINS
6TH DISTRICT, ILLINOIS

GOVERNMENT OPERATIONS

PUBLIC WORKS

Congress of the United States
House of Representatives
Washington, D.C. 20515

WASHINGTON OFFICE
1504 LONGWORTH BUILDING
AREA CODE 202, 225-5006

DISTRICT OFFICE
3851 W. ROOSEVELT ROAD
CHICAGO, ILLINOIS 60623
AREA CODE 312, 638-5555

February 16, 1972

Mr. Richard M. Wells
Colonel, Corps of Engineers
District Engineer
Department of the Army
219 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Wells:

Thank you for your letter of February 11, 1972, extending an invitation to attend your public meeting, February 29, 1972.

I regret that I will be unable to attend, however, I will have Mrs. Mildred Thomas of my staff represent me.

Again, I appreciated your informing me of this important meeting.

With best wishes, I am

Sincerely,

GEORGE W. COLLINS
Member of Congress

GWC/cs

List of Attendees - 29 February 1972
Illinois Public Meeting
Chicago-South End Lake Michigan Study

Representatives of Congressmen

Ms. Lynn M. Gericke for U. S. Senator Charles Percy
Ms. Edna A. Nadlin for U. S. Rep. Sidney R. Yates
Ms. Corinne W. Beard for U. S. Rep. Morgan Murphy
Mrs. Mildred L. Thomas for U. S. Rep. George W. Collins
Mr. John L. Swartz for Rep. Clyde L. Choate

Federal, State & Local Agencies

Mr. Jerome A. Gembara, Port of Chicago
Mr. Robert R. Pierce, BOR, Dept. of Interior
Mr. Jon-Eric T. Stenson, U. S. Environmental Protection Agency
Mr. R. S. Schneider, U. S. Environmental Protection Agency
Mr. Walter Romanek, Ill. Pollution Control Board
Mr. Robert T. Sasman, Ill. State Water Survey
Mr. James Wahler, Lake County Regional Planning Commission (Illinois)
Mr. George A. Smith, Hannah Inland Waterways
Mr. Louis Windish, Knox and Warren County
Mr. J. H. Beaman, Supt. of Water, Lake Forest, Ill.
Mr. Bernard H. Cooper, Metropolitan Sanitary District of Greater Chicago
Mr. Don B. Gallay, City of Chicago
Mr. George T. Iwicki, Village of Morton Grove
Mr. Parikh Kernel, Lake County Regional Planning Commission (Illinois)
Mr. Joseph McDermott, Chicago Park District
Mr. Richard J. Ryan, Metropolitan Sanitary District of Greater Chicago
Mr. Frank P. Salathe, Lake County Regional Planning Commission (Illinois)

Citizens Organizations

Mr. Lyman Anfield, Cook County Clean Streams Committee
Mr. H. V. Bierma, Illinois Audubon Society
Mrs. Lee Botts, Lake Michigan Federation
Mrs. Cora Lee Brannon, League of Women Voters
Mr. D. M. Dailey, Citizens of Greater Chicago
Mrs. Eileen L. Johnston, Wilmette League of Women Voters
Mr. R. Kirkconnell, Izaac Walton League
Ms. Helen Meier, Sierra Club
Ms. Lee Meyers, Sierra Club
Mr. James Parker, North Branch Coalition
Mrs. Samuel Rome, Ill. League of Women Voters
Mr. Arthur W. Walz, Prairie Club of Illinois
Ms. Kathryn West, Lake Michigan Federation

Exhibit II-2

Interested Citizens

Ms. Ivan G. Anderson
Mrs. John F. Perkins

News Media

Mr. Casey Bukro, Chicago Tribune
Mr. Harlan Draeger, Chicago Daily News
Mr. Gary Robinson, City News Bureau

Consultants and Commercial Interests

Dr. Joe Goeppner, Cather Engineers
Mr. C. Fred Gurnham, Gurnham and Associates, Inc.
Mr. R. J. Sutphen, Fitzsimons & Connell Dredge & Dock
Mr. J. N. Macomb, Jr., Inland Steel Co.

Corps of Engineers

Colonel Richard M. Wells - District Engineer, Chicago District
Major Leroy R. Hayden - Deputy District Engineer, Chicago District
Mr. John McCann - Representative, Office Chief of Engineers
Mr. William J. Santina - Chief, Engineering Division, Chicago District
Mr. James Maas - Chief, Planning Division, Chicago District
Mr. Carl W. Hessel - Head, Long Range Planning Branch, Planning Division
Mr. W. Henry Sanders, III - Civil Engineer, Planning Division
Mr. Imre Szekelyhidi - Hydraulic Engineer, Planning Division
Ms. Neola M. Eichmeier - Acting Head, Public Affairs Office

February 29, 1972
18034 Sayre Avenue
Tinley Park, Illinois 60477

United States Senator Charles H. Percy
Room 1200
New Senate Office Building
Washington, D.C. 20510

Dear sir;

I have read this letter at the public hearing in Chicago at 219 S. Dearborn Street in room 1220 at the Everett McKinley Dirksen Bldg on Tuesday February 29, 1972. This public meeting was called by the U.S. Army Corps of Engineers to hear public testimony about wastewater disposal problems.

At the last Cook County Clean Streams Committee meeting held in the Forest Preserve of Cook County Headquarters in River Forest on February 8th, Mr. Norton Saxton, Chief of Operations of the Chicago District, Army Corps of Engineers made the remark that the Corps is having a water problem due to the freezing of the Little Calumet River. He said that this stream had four inches of ice on it. It goes without being said that four inches of ice can tie up a whole lot of water on any stream. It appears that due to the efforts being made in Illinois and Indiana this stream is becoming more pure with the decrease in wastes being dumped into it. I am certain that the water from the Little Calumet watershed that flows into the Cal Sag Channel contributes to maintaining water for navigation.

I called him about his remark about a water shortage at his number 353-6432. He told me that the water coming out of the Little Calumet watershed varies considerably. During periods of dry weather and drought more water has to be diverted from Lake Michigan to maintain depth in the Cal Sag Channel. It is obvious a foot of depth is lot of depth to people operating barges that are loaded. As is well known the water in Lake Michigan is considered potable. It is in better shape than is water in other areas. By being potable it has considerable value when delivered to people in other areas who have water shortage problems. As you know petroleum products are delivered to the Chicago area by pipe lines and pumps. If the cost factor allows perhaps some day it will prove practical and feasible to transport water from our Lake Michigan long distances even as far away as Oklahoma and Texas where the petroleum products are transported from today. Since Chicago is allowed by law to take just so much water from Lake Michigan it seems a terrible waste to use this potable water for navigation purposes only. Most of the water used from Lake Michigan is used twice. Once by the population and industry in the area and again by the Army Corps to maintain depth in the navigable area waterways.

So this brings me to the reason for this letter. At our Cook County Clean Streams Committee meetings flood prevention and retention has been discussed many times. As far as I can see flood water if controlled and if it has a use it can be a blessing instead of a curse.

Exhibit II-3

As you undoubtedly know Metropolitan Sanitary District of Greater Chicago is attempting to have installed flood retention ponds with the intention to release the storm water after a storm down the stream and then return the pond to its dry condition for use as play grounds or what ever the community where it is located sees fit. It should be obvious that MSD is ham strung in its objective by its limited size and power. Unfortunately MSD is not set up to conform to natural watershed boundaries that cross county and state lines. Within its limited jurisdiction MSD is doing one very good job. My admiration for our MSD people is very great.

My suggestion is that Metropolitan Sanitary District and the Army Corps work together as they have done so well in the past to expand the flood pond concept into flood lakes. Flood ponds will be needed especially in heavily populated areas where the space is limited. Perhaps flood ponds underground with buildings over them may be the answer to lessen flooding in some areas. Within the watershed of streams there are natural places where flood lakes are more ideally suited than are dry weather dry flood ponds. As for instance peat bogs that used to be lakes during glacial times. Such areas would need a considerable amount of removal of the peat. Peat seems to be a saleable item and might fit the cost factor and could be justified on a matter of economics.

Such lakes when properly built could be drawn down in times of drought to a minimum depth. Probably these lakes would never maintain fish to any great extent since much of the water would be salty from run off from the streets and the lakes would be considered polluted. Probably such lakes would have to be reserved for boating. If the lower class of scavenger fish could survive I am sure ways could be found to keep the ice from freezing and to maintain oxygen in the water in the lakes. The esthetics of the lakes should be obvious. If proper and adequate storage is provided less flood plain would be needed down stream to accomodate the storm water during major storms. This flood plain or at least the areas that go under rarely during major storms could be filled in and raised above the water. The dirt from the excavated lakes might be used for this purpose. Of course it would be sold to the subdivider.

The lakes full of flood water could be used by the Army Corps to lesson the peaks between droughts and an over supply of water during major storms. By the use of this storm water probably the channels would not have to be dug so deep or maintained so deep to float the heavily loaded barges. As you probably know the Army Corp has a real problem during real severe storms. In times past as you know water has had to be diverted into Lake Michigan. Perhaps flood reservoirs might lessen the need to divert into the lake and help maintain the purity of our potable water supply.

I do hope I have been of service. I do hope a cost study can be instituted and this suggestion of flood storage lakes is found practical and reasonable.

Sincerely yours

Lyman Anfield

Lyman Anfield

February 29, 1972

COMMENT ON THE CORPS OF ENGINEERS CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

Gentlemen:

I am Mrs. Lee Botts, Executive Secretary of the Lake Michigan Federation, a coalition of citizen organizations in the four states around the lake. There are several reasons to object to the Corps of Engineers Chicago-South End of Lake Michigan Wastewater Management Study, but they all come down to the question of whether the Corps is the proper agency to make such a study. I do not think so, and this is why:

1. Although the Corps states they have undertaken the study in response to Congressional requests, I believe the initiative came from the Corps and for the Corps' own reasons. One ground for this belief is the fact that the Congressional resolution supporting a feasibility study of a series of islands or a dike with a causeway around the south end of the lake was used as part of the authorization for the regional waste management feasibility study issued in July, 1971.

This resolution was obtained in 1969 by the efforts of Dr. John Sheaffer, who at that time was on the staff of the University of Chicago. He had conceived the dike plan and presented it to the Corps of Engineers. He then persuaded Senator Birch Bayh of Indiana to introduce the resolution to Congress authorizing the study. The study was never actually undertaken, at least in part because of the opposition it met from organized conservationists in Indiana once they became aware of it. Then in 1970 Dr. Sheaffer joined the Corps of Engineers staff in Washington.

In my comments on the feasibility study report of July, 1971, I questioned whether the authorization obtained by Sheaffer for a different purpose could properly be used by the Corps as a mandate to undertake a different study, even though it was also conceived by Dr. Sheaffer.

Subsequently, one Corps official in the district office assured me that the Bayh resolution had been used only as an expedient and would no longer be used because the Corps had obtained specific authorization for the South End of the lake study that is the subject of this hearing. The point is whether an agency that will make use of expedients in this manner can be believed when it says why it is doing what it wants to do. This brings me to the next point.

Exhibit II-4

2. The Corps says it is "totally uncommitted to any specific system" and its study "is based on the concept of developing alternatives which are capable of producing effluent conforming to two primary levels, i.e., state standards and no discharge of critical pollutants." There are two major problems or reasons why I find it difficult to accept these statements at face value. One is that Dr. Sheaffer, who now has the title of Science Advisor to the Secretary of the Army, has repeatedly said in print and orally that the Corps is studying application of the Muskegon County system to large metropolitan regions. While he refers to "alternative systems" he nevertheless talks in terms of transporting effluents away from an urban area for disposal by a spray effluent system on land. He makes very compelling arguments for such a system as a means to promote recycling of organic nutrients. Many in this room have read Dr. Sheaffer's arguments or heard him present them.

No matter what the Corps says about not being committed to a single system, their science advisor is still promoting his current favorite system in relation to the five regional studies in metropolitan areas, including this Chicago-South End of the lake study. I know he is still doing it, no matter how the Corps has modified its previous statements of the goals of these studies, because I have been asked to comment on an article he has written on the subject that is to be published.

The trouble with Dr. Sheaffer's arguments, and the Corps studies of the system he proposes as presented in their feasibility studies, is that they have ignored many of the questions that would have to be answered.

For example, the kind of system envisioned by Dr. Sheaffer on the scale he advocates would require approximately one per cent of the land in Illinois. Since there are 101 counties in this state, one might, for the sake of conversation, ask which county would be dedicated to disposal of sewage wastes from the Chicago metropolitan region? Is there a county willing to be sacrificed for such a purpose? If a number of smaller areas instead of one or two are to be used, who will decide where they are to be?

For large areas or small, who will manage the land to take advantage of the opportunity to recycle nutrients for crops? Is the Corps of Engineers to become a farm agency, too? Would the land be taken over by government and then returned to private use when it could no longer be used as part of the waste disposal system?

These are political and social questions, but they have to be answered before there can be commitment to such a system. There is an additional problem then in doubt about the ability of the Corps to deal with them, and unwillingness to authorize the Corps to develop such a plan without either having

specific answers or being able to trust the Corps.

3. The third point I want to raise then is to question the capacity of the Corps to undertake such a massive planning effort when its function is to build rather than to plan. The result of this fact is that it seems safe to assume that what the Corps plans is what it intends to build, or at least would like to.

The Corps' inability to consider all aspects of regional projects is illustrated by its proposed draft environmental state for the Upper Mississippi River Comprehensive Basin Study, one of its regional planning efforts. On the question of environmental impact of a regional plan, the Corps statement has this to say, after explaining why it does not make specific project proposals just as it says it is not committed to a specific plan for the south end of Lake Michigan: "The framework...should be considered a guide to the use or combination of uses of the resources in future development and planning phases of resource management. However, it does not propose a plan or recommend specific projects."

Further, under Environmental Impact of the Study, it is stated: "Thus the primary environmental impact of the framework for development program is the increase in economic activity that would result in meeting needs for water and related land resources..." However glorious this may sound to those who believe in development for development's sake, please note that nowhere does the Corps statement say at what environmental cost this increase in economic activity will be achieved. In fact, the statement goes on to say, under a heading "Adverse Environmental Effects Which Cannot Be Avoided," that "specific adverse environmental effects cannot be described at this time" and will only be stated when specific projects are proposed.

In other words, what the Corps is really asking is that it be delegated regional planning authority to plan for specific projects for developing water resources without telling the public or other governmental authorities what adverse environmental effects will be the result. Let me tell you another reason why I, as a conservationist, am unwilling to give the Corps that authority.

4. While the Corps is proceeding, in its own words, to consider alternative water quality goals for the year 1990 and then the year 2020, national policy on these same questions is being debated by Congress in its consideration of the Water Quality Pollution Control Act of 1972. Is the Corps taking upon itself the authority to ignore the national policy called for under both the Senate and the House Public Works Committee

version of the bill, no discharge of pollutants by 1985? The bill designates the National Academy of Science to undertake a two year advisory study of whether such a goal is unreasonable.

I am asking, did Congress really mean to ask the Corps to undertake a separate study of the same issues on a different timetable? Or did members of Congress think they were asking the Corps to do something else, as with the resolution authorizing a study of dike that was used to authorize a study of regional waste disposal system?

5. My final objection has already been stated under the previous points but I wish to reiterate it here: namely, the Corps should not be authorized to study the feasibility of regional projects which it would then, by their very scope and nature, have the major role in building. It is the same principle as separating the promotional and regulatory functions of the Atomic Energy Commission.

We have already had in this country sufficient experience with allowing the Corps to plan and to carry out flood control projects to warn against allowing a similar function in regard to regional waste management systems. I totally disagree with Dr. Sheaffer's statement to me last September when he said that the Corps had demonstrated by its success in flood control starting in 1936 its ability to undertake large planning projects which no other agency was equipped to handle. In my view what was demonstrated by that experience with the Corps was that it will use a legitimate public policy goal to keep itself in business as a construction agency, to build dams or channelize streams or perhaps to lay pipes to carry sewage effluent downstate, regardless of the environmental cost and without considering the total economic cost.

Of course, I favor investigation of recycling of resources out of place, as Dr. Sheaffer expresses it so eloquently; of course, I favor long range planning. I am unwilling to leave consideration of the means of achieving these goals up to the Corps of Engineers because I mistrust the agency's ability to separate self-interest in perpetuating its function as a construction agency from its proposed planning function.

To summarize, I have given five reasons for this position:

1. There is evidence that the initiative for the regional wastewater management studies came from the Corps of Engineers itself and at least in part under Congressional authorization intended for another purpose.

2. Although the Corps says it is not committed to a specific system, its chief advisor advocates chiefly the "Muskegon County" approach and fails to consider the political and social questions that would have to be answered.

3. Because the Corps' primary function is construction rather than planning, it has little capacity to plan except what it plans to build.

4. The water management alternatives the Corps says it will be considering are already being debated as national policy by Congress in connection with the Water Pollution Control Act of 1972, suggesting that the Corps intends to set its own policy for regional development.

5. The planning function for regional wastewater management should be separated from the construction function; since the Corps is a construction agency, it should not also be the planning agency that decides what to build.

SECTION III - INDIANA PUBLIC MEETING SUMMARY
(Indiana University Northwest, Gary, Indiana)
7 March 1972

PREPARED STATEMENTS

Letters from Congressmen John Meyers and Carl Landgrebe were referenced for inclusion into this record (See Exhibit III-1; also attached for the record is the attendance list).

Mr. F. LEONARD COVENTRY, Superintendent of the Gary Sanitary District, spoke at the conclusion of the Corps briefing. Mr. Coventry addressed the problem of reversing the degradation of Lake Michigan, noting that, although technology exists to accomplish this task, there seems always to be a monetary deficiency. Mr. Coventry also enumerated other concerns of the Sanitary District, presenting a series of questions he felt require resolution during the current study. (See Exhibit No. III-2)

MR. HERBERT READ, a member of both the Izaac Walton League and Save the Dunes Council, stated his support for the current study and his pleasure with the Corps' procedure for obtaining comments from the public. Speaking extemporaneously, Mr. Read noted concern in what he considered a flaw in the Corps' study approach of "no pre-emption of State responsibility". He felt that, due to the diverse interests of State and local agencies and the resultant differing viewpoints and conflicts of interest, the Federal Government is the only remaining governmental level capable of performing such a study and able to supercede conflicting local interests.

Mr. Read felt there would also be an inherent flaw in the efficacy of the Steering Committee due to what he considered an inbred repetition of viewpoint and inbred bureaucracy, questioning also the means by which Committee members were selected.

Mr. Read concluded that such studies are massive undertaking which must be done, but the emphasis should no longer be wastewater discharge to water bodies; rather, Mr. Read suggested individual home site disposal in less populous areas, citing devices presently on the market capable of achieving home site disposal. [Statement Not Submitted]

COLONEL WELLS in response explained that the Steering Committee is intended to reach all levels of government (local, State, and Federal) and indicated that "heated but frank and constructive" discussions often evolve from such meetings. The Steering Committee, he added, should be a significant help in development of the study.

MR. PAUL SEMON, representing the Citizens of Whiting, presented some of the viewpoints and concerns of his organization. Mr. Semon cited proposals by Whiting officials to construct a 6.5 million gallon per day tertiary treatment sewage treatment plant, serving only 7,000 people but capable of serving 30,000. Mr. Semon expressed concern with what he felt was gross oversizing of facilities paid for by taxpayers to the benefit of others, and the lack of interest of Whiting officials, as evidenced (according to Mr. Semon) by their absence from the public meeting.

Mr. Semon also objected to proposals (by Whiting officials) for a large, open retention basin for raw sewage, citing the need to look into other alternatives. Lastly, Mr. Semon expressed the hope that the Whiting proposals cited above be made consistent with those from other State, Federal and local agencies, to preclude a waste of tax dollars. [Statement Not Submitted]

MR. EDWARD OSANN, ECO-Vote '72 Chairman, stated his support for having the Corps undertake the study, but felt that use of the year 2020 as a framework would result in "spreading" the study "too thin". Mr. Osann suggested the Corps concentrate on the year 1990, especially since, he stated, it would be impossible to postulate the social and political changes to the year 2020. [Statement Not Submitted]

COLONEL WELLS agreed and underscored the Corps intent to concentrate on the year 1990 for the development of treatment facilities. The year 2020 is to be used only as a framework for developing systems which could be effectively expanded to meet future needs.

MRS. SILVIA TROY, President of Save the Dunes Council, questioned whether the Corps should be evaluating a project which, she stated, it will be constructing. There exists an inherent conflict of interest, she asserted; hence these two functions should be separated and the evaluation done by a separate agency. Mrs. Troy suggested that perhaps the Federal EPA or some other agency should make a judgement of the Corps plans.

Mrs. Troy cited what she considered a "sad Corps record" in erosion control in the Michigan City area, noting the loss of a million dollars in real estate along the shore in the Beverly Shore area. The procedures for issuing permits she felt to be "sadly lacking" and in need of change. Further, she felt the GAO Report clearly delineated the detrimental impacts on the Indiana National Lake Shore and pollution control; yet, she declared, the Corps approved reimbursing the State in excess of a million dollars for the project [Burns Waterway Harbor]. These examples, Mrs. Troy felt, indicates a poor record of the Corps in the environmental area. She suggested environmentalists withhold support from any Corps project until the Corps produced "real evidence of reform". [Statement Not Submitted]

COLONEL WELLS replied that the Corps hopes this study will provide evidence of the Corps' concern for both a vital conservation program and a rehabilitation of degraded natural resources. As regards Mrs. Troy's concern of a potential conflict of interest, the Corps does not anticipate being involved in constructing the facilities which may evolve from the recommended plans. The study is being done in compliance with Congressional directives and as an aid to State and local governments by taking an unbiased, regional viewpoint of the wastewater management problems.

Questions and Answers

A question and answer period followed and is summarized below.

Q: What prompted the Corps to study water pollution problems from the sanitary facilities viewpoint?

A: The directive and funding came from Congress. The survey scope study was authorized by separate resolutions from both Public Works Committees of the House and Senate adopted in November 1971. Five pilot studies are being initiated at key locations across the nation to ascertain what type of technology is feasible, what kind of programs (including reuse) could be effectively implemented by the states, and the cost and benefits involved in the various programs.

Q: Are newspaper articles which state that the land disposal method will be utilized in this region accurate?

A: No, the land concept will be only one of different techniques considered in the treatment of wastes. There is no pre-commitment to any particular system. In all probability no one "pure" system will be recommended but rather a hybrid of different ones.

Q: You [Col. Wells] have stated that the Corps will consider a wide range of alternatives; you referred to special sessions for local sanitary districts in workshops; and you said that the Corps will not be constructing facilities. What additional constraints are there [in development of the study]?

A: The responsibility for planning and implementation of wastewater treatment facilities rest with the States. The States must produce plans, and implementation procedures for the plans, to the Federal EPA. The Corps is trying to assist the States by looking at other aspects, eg, regionalization (economics of scale) and effective use of all resources.

We are involving local sanitary districts to obtain their views and ideas of problems and proposals for incorporation into the Corps plans. As stated before, the Corps intends to work closely with all concerned to achieve a plan of high merit. A complete interchange of ideas should produce viable plans that the States can adopt if desired.

Q: What is the role of the Steering Committee and where does the decision making (ie., evaluation power) lie within the total structure?

A: There are two levels of decision making. The first level rests with the District Engineer in determining the approach and conduct of the study. Again, to recapitulate an earlier statement, the second level is the decision to choose a plan for implementation. This decision rests first with the States to propose plans and implementation procedures, and then with the Federal EPA to approve these plans, a sort of veto power. The Corps therefore must produce plans which the States will want to adopt and implement; hence we have to ensure that the study is responsive to a diversity of interests, weigh the various conflicts of interest, and produce the optimal overall plans.

Towards this effort the Federal EPA is working with us by membership on the Steering Committee.

With no further questions, the meeting was adjourned.

JOHN T. MYERS
7TH DISTRICT, INDIANA

HOME ADDRESS:
921 SECOND STREET
COVINGTON, INDIANA 47932

WASHINGTON OFFICE:
103 HOUSE OFFICE BUILDING 20515
TELEPHONE: 202-225-5805

Congress of the United States
House of Representatives
Washington, D.C. 20515

COMMITTEE:
APPROPRIATIONS

7TH DISTRICT OFFICE:
203 FEDERAL BUILDING
TERRE HAUTE, INDIANA 47808
TELEPHONE: 812-232-1652

February 24, 1972

Colonel Richard M. Wells
Department of the Army
Chicago District, Corps of Engineers
219 South Dearborn Street
Chicago, Illinois 60604

Dear Colonel Wells:

Thank you for your letter concerning a public meeting to be held in Gary, Indiana, on March 7 to provide information and to seek public views concerning the Corps of Engineers Wastewater Management Study for the Chicago-South End of Lake Michigan Area.

It was kind of you to invite me to participate in this discussion, however, I am sorry I will not be able to attend. Due to the legislative schedule here in Washington, it will be impossible for me to be in Gary on that date.

I appreciate your including me in your plans and extend best wishes for a productive session. With warm regards, I am

Sincerely,

John Myers

John Myers

a

Exhibit III-1

EARL F. LANDGREBE
2ND DISTRICT, INDIANA
1238 HOUSE OFFICE BUILDING

COMMITTEES:
EDUCATION AND LABOR
DISTRICT OF COLUMBIA
TELEPHONE 202-225-5777

Congress of the United States
House of Representatives
Washington, D.C. 20515

March 1, 1972

Col. Richard M. Wells
Corps of Engineers
Chicago District
Department of the Army
219 South Dearborn Street
Chicago, Illinois 60604

Dear Gentlemen:

It appears that it would be impossible for me to be present at the Corps of Engineers Wastewater Management Study scheduled for March 7 at the Indiana University Northwest campus.

I am sending all of the information on this meeting to my District Representative, Mr. Roy Hibner, with instructions that he be present if at all possible.

Thank you for calling this important conference to my attention.

Yours very truly,

Earl F. Landgrebe

EFL:ag

cc: Mr. Roy Hibner
418 School Street
Michigan City, Indiana 46360

List of Attendees - 7 March 1972
Indiana Public Meeting
Chicago-South End Lake Michigan Study

Representatives of Congressmen

Mr. & Mrs. J. Silberman, for. State Senator Adam Benjamin, Jr.

Federal, State & Local Agencies

Mr. John - Eric T. Stenson, EPA Region V
Mr. James O. Russell, Indiana Department of Natural Resources
Mr. Richard J. Cleaton, Indiana State Board of Health
Mr. Joseph Senetar, Highland
Mr. M. W. Nicewander, Highland Sanitary District
Mr. Thomas D. Moeglin, Gary Health Department
Mr. Stelsell Melton, Gary Sanitary District
Mrs. Mildred Melton, Gary Sanitary District
Mr. Ray Adams, Lake County Planning Commission
Mr. Leon Chambers, Hammond Sanitary District
Mr. Dale H. Catt, Crown Point
Mr. Richard C. Collins, Crown Point Mayor
Mr. Nicholas Cast, Gary Sanitary District
Mr. F. Leonard Coventry, Gary Sanitary District
Mr. Gibbert DeLaney, Hammond Sanitary District
Mr. Philip S. Jaynes, Jr., Little Calumet River Basin Commission
Mr. Gerald F. Johnson, Sanitary District of Hammond
Mr. Jan A. Kadelah, Gary Health Department

Citizens Groups

Mr. Steve R. Banka, I.U.M., BSFAC
Mr. Delbert D. Biffert, Liberty Farm Tr. Ct.
Mr. John G. Bubik, Gary Jaycee's
Mr. Harold G. Emmerth, Whiting Tax Payers League
Mr. Allan Frederick, Izaac Walton League
Mr. Robert Frost, Griffith IWCA
Mr. Charles Greskovieg, Whiting Tax Payer League
Mrs. R. D. Herlocker, American Assn. of University Women
Mr. Edward R. Osann, ECO-Vote '72
Mr. Stanley R. Prince, NW Ind. Clean Air Coordinating Committee
Mr. Herbert Read, Izaak Walton League
Mr. Richard Segall, Brookview Homeowners Association
Ms. Dorothy Seman, Whiting Tax Payers League
Mr. Paul A. Seman, Whiting Tax Payers League
Mrs. Silvia Troy, Save the Dunes Council
Mr. Michael A. Zimmerman, Gary Jaycees

Exhibit III-2

Citizens

Ms. Lynne A. Banka
Mrs. Marian DeLaney
Mrs. E. C. Holmgren
Mr. David Julovich
Mr. Paul Kerschner
Ms. Carol Klawitter
Mr. Victor H. Weidmann
Mr. Jesse A. Wood

Consultants & Commercial Interests

Mr. Gary L. Wilson, Hammond Times
Mr. Ralph Clendenin, National Construction Corp.
Mr. Steve Corona, WLTH Radio
Mr. Charles A. Froman, Jr., Gary Hobart Water Corp.
Mr. Bob Jackson, The News-Dispatch
Mr. Donald Jaeger, Lincoln Garden Utilities
Mr. Leo-Louis, Gary-Hobart Water Corp.
Ms. Clara Mager, Utilities Inc.
Mr. M. A. Mager, Utilities, Inc.
Mr. David P. Nusins, Independent Citizens Water Pollution Research, Inc.
Mr. Walter Rayder, National Construction
Mr. R. L. Toering, U. S. Steel, Gary Works
Mr. Dale C. Wilkerson, American Trailer Ct.

Corps of Engineers, Chicago District

Colonel Richard M. Wells, District Engineer
Major Leroy R. Hayden, Jr., Deputy District Engineer
Mr. James M. Maas, Chief, Planning Division
Mr. Carl W. Hessel, Chief, Regional & Long Range Planning Branch
Mr. William H. Sanders, Regional & Long Range Planning Branch
Ms. N. Mickie Eichmeier, Public Affairs Office

STATEMENT OF THE GARY SANITARY DISTRICT

PRESENTED AT PUBLIC HEARING

MARCH 7, 1972

CONDUCTED BY U. S. ARMY CORPS OF ENGINEERS

CHICAGO DISTRICT

Ecology and our Engironment are "big" these days. Two years ago, we had Earth Day in our nation. Seminars and conferences were held throughout the country in universities and schools. Yet the facts are that nothing much has been accomplished during the past two years except talk.

Purdue University has defined Ecology as the science which tells people who won't listen about ways they won't follow for saving an environment they don't appreciate.

As a professional, I can say that the whole business of pollution control is just a matter of money. Much of the technology we have - money we do not. A woman said to me the other day, "Let the government take care of pollution." Now, whom does she think constitutes the government?

How can we use Lake Michigan for industry and at the same time save it for our own water supply (it is you know) and recreational purposes? In 1968 the four states of Michigan, Wisconsin, Indiana and Illinois in March began a series of hearings in Chicago, compiling testimony which fills seven volumes of documentation. These four conferees agreed on water quality standards for the Lake Michigan basin and tributary waters. Since Gary is a part of the basin, certain criteria were set along with time schedules to meet these various criteria. Time does not permit me to go into the details about the criteria for the Gary Sanitary District and the various time schedules imposed upon Gary as a result of the mandates now in existence. May I simply say that we are talking about many millions of dollars. Early in 1968, the District began the preparation of a Master Plan for sewers and treatment of storm water overflows from our combined sewer system. This has been documented and has been referenced in the Corps study.

The tragedy is that we have not been able to raise funds to proceed. We have put into our annual budget requests for a tax levy that would support cost of engineering to proceed. We have applied to the Federal government for aid-in-grants but have received no monies to date. For the past four years, our requests for additional operating funds have been denied by higher judicatories.

As a professional, I concur with the reasons given for looking at waste-water management alternatives as shown in the report on page III-11 of the Vol. 1 (Summary). Somehow we must emphasize that the combined sewer overflows during wet periods, which are "by-passed" flows, definitely degrade the quality of the water and are a factor in the polluted conditions of the waterways.

In our part of Lake County, Indiana there are many governmental and industrial organizations that profess interest in planning, constructing and operating various units for managing wastewaters - I am of the conviction that these efforts need to be brought together in some systematic framework if the citizens are to obtain economies of scale which can lower costs and make more effective treatment and produce other benefits. I have strong convictions that some sort of a regional approach will have to be developed. Almost continually, week upon week, the Gary Sanitary District is approached by land developers, citizen's groups, school districts, church administrative boards, etc. seeking a solution to the problem of wastewater disposal. Many wastewater treatment facilities require and have plans for expansion to meet the needs of the area's growing population. At Gary, our Master Plan includes areas outside the boundaries, but we must concur that this trend does not produce a regional solution in toto.

The proposed construction at many plants in the study area may be related to local problems rather than being a component of a regionalized system. Example: The Gary Sanitary District deep tunnel system to convey combined sewer overflow to a retention pond with storage in the tunnel-reservoir. This is a multi-million dollar project in itself. Another example: While the Lake-Porter Commission's study indicates that Gary's extension of service into the area south of Gary to one-half mile south of Route 30, and the elimination of some small treatment plants, should be implimented, the Gary Sanitary District is not now empowered by legislation to do this on its own initiative.

Planning and zoning measures may have to be more stringent to prevent further degradation of our streams and water resources. I would concur in the report of General Clarke that "new institutions with a regional scope may be required to adequately handle increased wasteloads from a physical, economic and social viewpoint."

As Manager-Operator of the Gary Sanitary District, I can testify to the inability to secure the necessary funds to operate only a small portion of the study area (though the Gary Sanitary District is the second largest such unit in Indiana). Each year we have failed to receive monies requested to implement wastewater management routine matters as we see them, due to the overriding authority vested in County and State Tax Review Boards and the body politic.

I disagree with Number 7, page V-15 of the Summary which states that "since fewer local treatment facilities will be required in the C-SELM area the jobs and incomes associated with their operation will be eliminated." I submit that the larger plants, being expanded, will require additional personnel to offset the loss by phasing out of the smaller plants. Actually, I envision a higher technical level of personnel to be required and higher salaries for operation of the proposed advanced wastewater treatment facilities. As a professional, I cannot make any sanitary engineering current assessment of the land disposal alternates because of the gap in information which is listed by the 8 items on page VI-1 of the Summary. I will simply say here, that social acceptance of the land disposal system is dependent upon solving the problems of odors, health hazards and changes in water table and convincing the populace that they are solved.

As stated, this feasibility study is the first part of a two-phase procedure to develop a regional wastewater management program. The second phase will further define and compare alternatives within these concepts with the aim of developing either of the alternates, or a combination of them, into a definitive regional wastewater management plan.

I would suggest here that some of the adverse impacts of any proposed wastewater management plan appear as questions requiring solution. It seems imperative to this local wastewater manager that Phase Two must include solutions and/or listing the enabling factors for solutions to these questions:

1. How can a regional plan be implemented? It is difficult to anticipate the entire gamut of legal problems that could emerge during the establishment of a regional wastewater system for any part or all of the study area. Indiana presently has no law which provides for even an intra-county wastewater system. The State has no law to provide annexation to a sanitary district by citizens of unincorporated areas.

2. How do we get the General Assembly to enact legislation for a part of the State? How do we get down-state legislators interested in Lake County and its problems?

3. How can unanimity be obtained by all local governmental agencies within any proposed region?

   A case in point is a city in Lake County, Indiana which currently desires to build its own treatment plant, in violation of the Master Plan for the Lake-Porter Commission, which is referenced so many times in the Corps study.

4. Regarding management, is it proposed that the State mandate formation of a regional plan and set up a Board of Control?

   Is it proposed that the Federal Government set up and operate a regional system?

5. Costs.

A. Present bonds. Who will pay out existing bonds and debt services of plants to be phased out?

B. Calculation of tax levy.
Assessed valuation for Plant R service area Alt. III water disposal.

$540,000,000.00 plus 50% increase by year 2000 =
$810,000,000.00

Annual costs:	Millions dollars
Debt service expense	
a. on current obligations GSD	1.5
b. new construction GSD in present district boundaries $150,000,000 x 3 ÷ 30 years' bonds	15.0
c. new construction Plant R and trunk lines Table IV-A-9 $200,000,000 x 3 ÷ 30	20.0
d. storm water collection system not included above in (b) $50,000,000 x 3 ÷ 30	5.0
Operation and Maintenance	
a. treatment @ $140 per MG (N and P removal) 200 MGD x $140 x 365	10.22
b. sewer maintenance @ $20 per MG 200 x 20 x 365	1.46
	53.18

Tax levy for the proposed region: $6.56 per $100 assessed valuation.

Whether we consider water or land disposal, I consider the biggest obstacle to be the major institutional realignments that will be required to control such a comprehensive system.

F. Leonard Coventry

F. LEONARD COVENTRY,
Superintendent
Gary Sanitary District

FLC/mm

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

STAGE I - PART 2

INITIAL CITIZENS ADVISORY COMMITTEE MEETINGS

(Summary - First Meetings)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

TABLE OF CONTENTS

Stage I - Part 2

Initial Citizens Advisory Committee Meetings

SECTION I - CORPS OF ENGINEERS' PRESENTATION

BACKGROUND INFORMATION

After his opening remarks Colonel Wells, Chicago District Engineer, briefed the Committee as to the background, authority, objectives, approach, and conduct of the wastewater management study. To place the different wastewater management studies in the proper perspective, Colonel Wells explained the nature of two previous Corps' studies. The first, a feasibility study, was undertaken to identify the present and future regional wastewater management problems, and to make a preliminary evaluation of the feasibility and consequences of several alternative regional wastewater management programs. This study was one of five pilot investigations conducted by the Corps at key urban areas across the nation. The other areas include Cleveland and Detroit on the Great Lakes, San Francisco, and the Merrimack River Basin near Boston.

Despite the warning that the cost data in the Feasibility studies was preliminary and incomplete, much of the data has been used out of context. Basically for this reason, the Office, Chief of Engineers recently conducted a quick, special study to update some of these costs for several conceptual systems. The Chief of Engineers selected the Chicago area for this special study. In releasing the special study, he alluded to the in-depth survey scope study now being conducted, and pointed out that the major effort and any recommendation from the Corps will evolve from this present study.

The current study was authorized by Congressional resolutions from both the House and Senate Public Works Committees dated 10 and 23 November 1971, respectively. Included in the language of the Senate resolution is the mission to "evaluate general alternatives for the management of wastewater on a regional basis, including the elimination of pollutant discharges." The study area includes portions of four counties in Illinois and three in Indiana (see attachment I-1) with major drainage to the Des Plaines River and Lake Michigan. Some 7.2 million people reside within this area.

PURPOSE AND SCOPE

This study will differ from ongoing State and local planning efforts in that it will: (1) evaluate wastewater management solutions on a regional basis, unconstrained by state boundaries, and (2) be responsive to the "No Discharge of Critical Pollutants" standards being contemplated in legislation currently under consideration by Congress.

The study will begin by identifying the existing State and local plans for meeting the current standards. This will constitute a Reference Base. Next, using the Reference Base as a starting point, the study will then develop an optimum plan to meet current standards, incorporating the concepts of regionalization (economies of scale) and effluent (water) reuse potential which may not have been considered in the Reference Base. The optimum plan will then be used as a Screening Base in later comparisons with alternative systems and designed to meet the higher water quality standard. As in the screening base plan, the opportunities for regionalization and reuse will be considered.

All plans will be formulated within the framework of system's meeting projected 2020 needs with design emphasis placed on plans for the year 2020.

RESULTS OF STUDY

The study results should assist the States, local agencies, and the public in at least three ways.

First, development of the Screening Base may identify opportunities for improvement in current plans for meeting existing standards and show how such improvements could be made without adverse impact on the on-going programs.

Second, the study will identify the best plan(s) for achieving the higher standard in the event they become Federal law. Then, the applicable costs and tangible and intangible benefits will be compared to those of the Screening Base (current standards). The differences in environmental, social, and economic considerations will be evaluated to facilitate public understanding.

Finally, the study may display technology not previously considered in State or local planning which could be used to advantage, regardless of the water quality standard finally adopted.

STUDY GUIDELINES

The following guidelines will be followed during the course of the study. The study will be undertaken as a service to the State and local governments, with no intention of pre-empting their responsibilities. Therefore, every effort will be made to insure that there is no disruption to the on-going planning, construction, and enforcement programs. To do this, the study will use as a common building block, the collection systems and facilities either completed, under construction, or expected to be in the advanced planning stage by July 1973.

Federal Environmental Protection Agency Guidelines will be followed to the maximum extent possible to ensure that the alternatives which evolve are suitable for implementation.

Furthermore, the study will be carried out in a "Fishbowl" type of atmosphere with maximum opportunity for input and participation by Federal, State, and local agencies, citizen interest groups, and the individual citizen.

A full range of alternatives will be considered with no pre-commitment to any specific wastewater collection, treatment, or disposal method. Each system will be designed to collect and treat all sources of pollution, including municipal, industrial, and stormwater flows. Treatment and disposal of all solids, liquids, and gaseous waste products will be followed through to their ultimate fate or destination, as part of the system's performance evaluation.

STUDY FRAMEWORK

The approach to be used in the conduct of the study is shown in Attachment I-2. The technical studies (including water reuse and conservation programs) will move through three district stages as shown on the main baseline (series of boxes on attachment). Subsequent to completion of the data base, which is nearing completion, a full array of alternatives will be generated for consideration. These alternatives will be formulated to meet the needs of the year 2020, thereby establishing a long-range study framework.

Next, the alternatives will be reduced in number by an evaluation and screening process. Those alternatives retained will then be refined, with system design restricted to that part of the plan which should be operational by the year 1990.

Finally, after a second screening analysis, the remaining alternatives will be designed and evaluated in detail for presentation in a draft report. The draft report will then be distributed for comment to all interested governmental agencies and citizen groups; the comments will be incorporated and included as part of the final report.

Concurrent with the technical work, a second part of the study team will assess the socio-economic and environmental impacts implicit in each alternative, while a third team will identify the inherent institutional changes and problems. A free exchange of information and suggestions for modification will be maintained throughout the study, as indicated by the arrows on the attachment.

To obtain a cross-section of ideas from the public, we hope to establish various citizen advisory committees representing different viewpoints. These committees, representing conservation and civic action groups, local planning and sanitary districts, and commerce and industry, will conduct their own workshops and actively participate in the plan-formulation and review processes. A farm committee will be formed at a later date. In addition, we will have a steering committee comprised of representatives of Federal, State, and local governmental agencies having a major interest in the technical aspects of wastewater management.

In addition, three sets of public meetings are scheduled. The first set, held about a month ago, was to apprise the area residents of the study's purpose and scope and to determine their concern. During the second public meeting the Corps will present the alternatives that have been developed and screened and seek public reaction and comments. Subsequently, at the final public meeting our findings and conclusions will be described for the public. Comments and recommendations will be incorporated in the report.

WATER AND RELATED LAND NEEDS

As previously indicated the design of the various alternative plans will be based not only on the objective of wastewater treatment but also on satisfying other water and related land needs. Therefore, we have established a check list (Attachment I-3) for identifying those preservation or action programs which should be considered in the plan-formulation process. Use of the list will insure that the study will be responsive to the national concern for environmental enhancement and social well-being as well as economic development.

The check list has been itemized in terms of basic need categories and characterized relative to potential resource commitments - land and water. This will facilitate evaluating the needs and identifying the types of improvements, structural and non-structural, that are required. The Recreational category has been divided into four (4) parts. The first part pertains to the in-stream programs and the design concern for stream flow quantity as well as quality, for each potential water usage. The second part is concerned with stream-related land-use programs and the land and facilities required to sustain specific types of recreational pursuits. The third part involves similar stream-related land-use programs but directs attention to programs for wildlife and waterfowl management, and esthetic and vegetative controls. The fourth and final part pertains to basic land use programs that would be responsive to the environmental and social well-being phases of the recreational category.

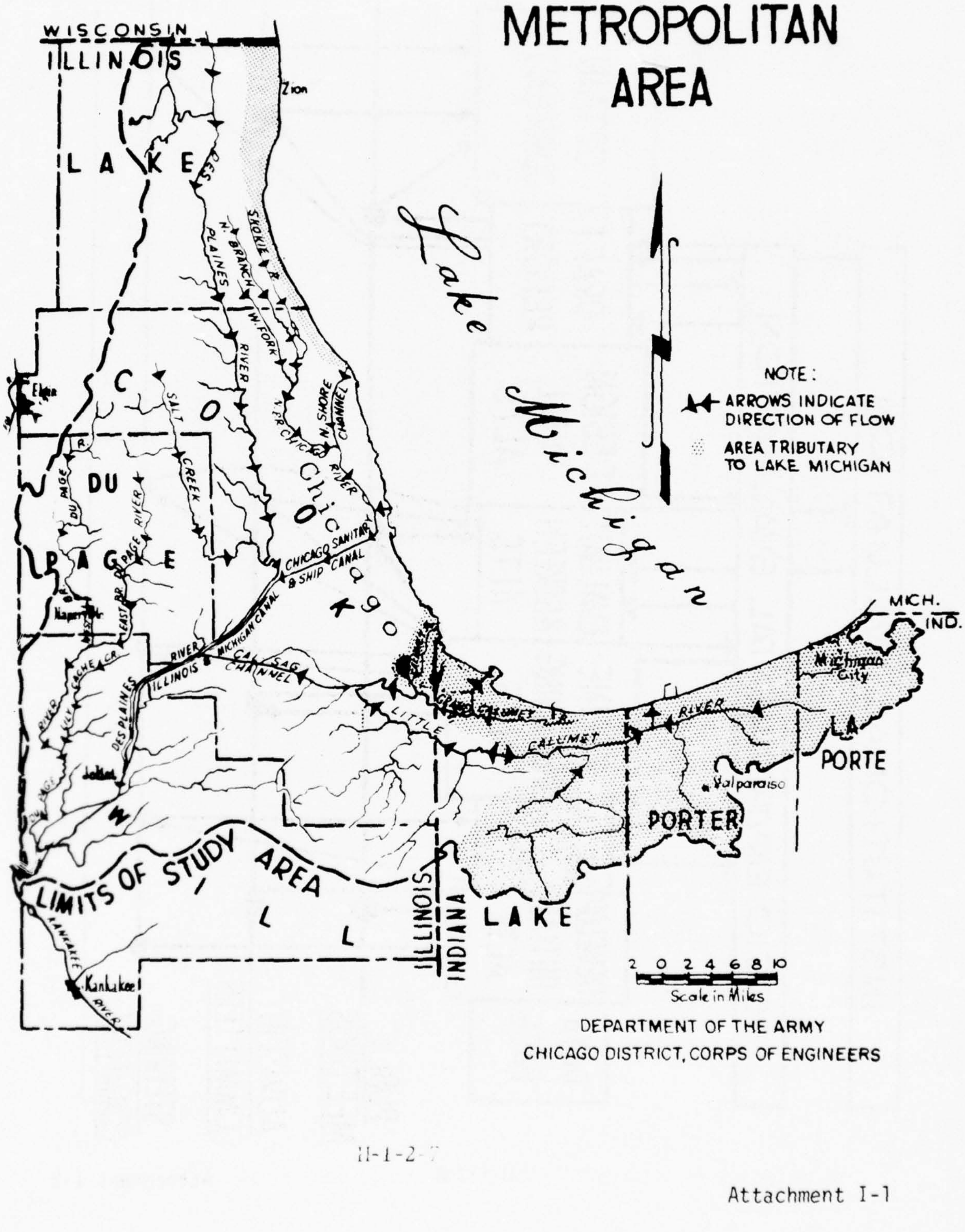
Because of the Environmental Committee's known concern for conservation, recreation and environmental practices, we have prepared a questionnaire, the answers to which will be used as direct input into the study (Attachment I-4). The questionnaire is designed to serve a dual use. First, it will provide an inventory of those lands or stream reaches which will require an active restoration or preservation program. The second is to determine what types of developments are required to provide a diversity of recreational pursuits.

Similarly, because of the known concerns of commercial and industrial interests in terms of economic feasibility, impact on current operations, etc., we have prepared a questionnaire - "Industrial Inventory and Need Assessment" - the results of which will also be used as direct input to the study (Attachment I-5). The purpose of the questionnaire is to (1) assess the present and future water needs of commerce and industry, (2) integrate this information into a regional system, and (3) provide for the expected wastewater loading of commerce and industry.

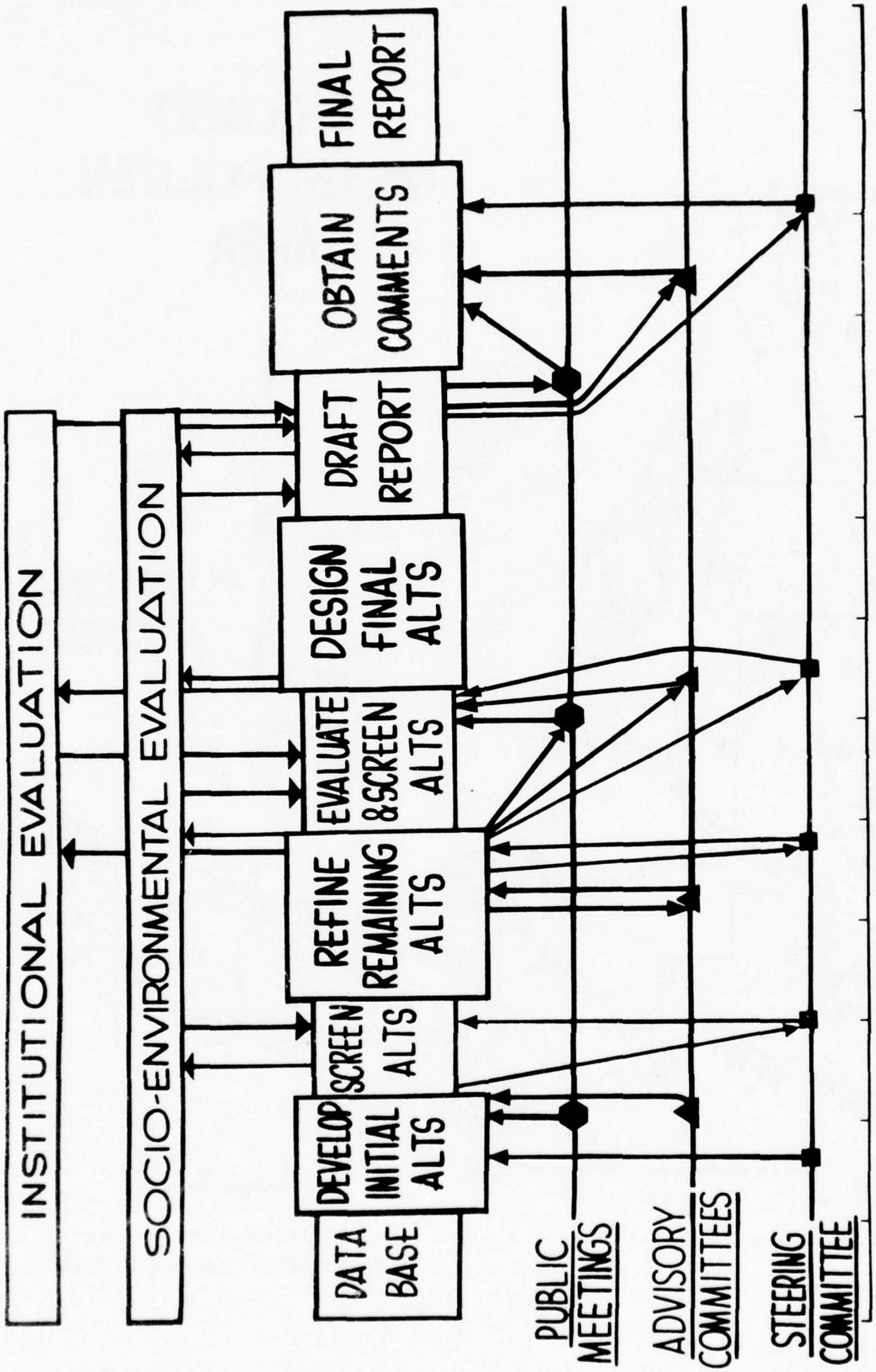
The questionnaire is divided into three parts. The first pertains to present operations, the second to potential for operational changes, and the third to land-use potential for waste handling. Also attached to the questionnaire is "Alternative Process System Performance Data", the minimum list of critical pollutants alluded to earlier.

It is within this context that we are seeking the assistance of Committee members, both by distribution and response to the questionnaire.

CHICAGO METROPOLITAN AREA



DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS



Attachment I-2

REUSE

I. RECREATION CATEGORY

A. Stream Related Programs
1. Maintain Minimum Base Flow
a. esthetics
b. vector control
2. In-Stream Recreational Uses
a. fishing- flow requirements for aquatic ecosystems and fishery production ("Q" &/or depth relationship)
b. boating- depth and surface area (other than sailing)
c. swimming- depth and surface area
d. water skiing- depth and surface area
3. Stream Related Land Use
a. greenbelt corridor- continuous or intermixed with other uses.
b. general recreation
i. picnic
ii. site seeing
iii. camping
iv. boat access sites
v. hiking and nature trails
vi. horseback trails
vii. bicycle trails
viii. snowmobile trails (seasonal)
ix. off-stream recreational ponds (winter and summer usage)
c. wildlife
i. refuge-bottomland type
ii. refuge-waterfowl
iii. hunting areas
iv. acquisition of land for wildlife food plots
d. general
i. vegetation management & planting program
ii. width of greenbelt-use of one or both sides of stream
iii. access control
iv. types of support facilities
v. constraints induced by level of treatment-i.e. existing standards or no discharge of critical pollutants

B. Other Programs
1. Establishment of Additional Recreational Park Lands
a. expansion of present parks
b. creation of new parks
2. Establishment of Additional Wildlife Lands
a. expansion of present
b. creation of new
3. Establishment of Connecting Corridors
a. between park systems
b. between parks & streams
4. Establishment of Additional Water Impoundments
a. expansion of present
b. creation of entirely new impoundments
c. quality of water needed

B. Other Programs, cont'd.

5. Preservation and Restoration of Historical and other Significant Sites
6. Fish Programs
   a, Put and Take - urban usage
   b. supporting hatcheries (locations, i.e., treatment lagoons)

II. WATER SUPPLY CATEGORY

A. Municipal(Domestic)-Industrial
1. Direct
   a. municipal system direct supply through water treatment facility
   b. industrial user, direct supply, at different levels of wastewater treatment
2. Indirect
   a. municipal system indirect supply
      i. *stream augmentation*
      ii. ground water recharge
   b. industrial system indirect supply
      i. stream augmentation
      ii. ground water recharge

B. Industrial- Special
1. Cooling ponds
2. Cooling canals

III. GROUND WATER RECHARGE

A. Water Supply- replenishment of aquifers which are approaching critical drawdown.

B. Flow Augmentation- to surface waters by raising of ground water table.

IV. FLOOD CONTROL CATEGORY

A. Flood Control Impounding
1. Selected discharge
2. Intermittent storage with other use possiblities

B. Flood Plain Management

V. IRRIGATION CATEGORY

A. Study Area-little chance for use
1. treated water
2. secondary effluent

B. Outside Study Area
1. treated water
2. secondary effluent

VI. NAVIGATION-COMMERCIAL

A. Study Area
1. flow augmentation
2. reapportion relative to Lake Michigan diversion

B. Outside Study Area- Illinois water way system

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO ILLINOIS 60604

NCCPD-RL

26 April 1972

Dear Conservation Friend,

To identify areas of conservation concern, the Army Corps of Engineers requires assistance with the enclosed questionnaire.

Information obtained with the questionnaire will be used by the Corps in its Chicago-South End of Lake Michigan Study. The purpose of the study is to consider alternatives for management of waterways in the study area shown on the map also enclosed.

A second phase of the study, now under way, is scheduled for completion early in 1973. To advise the Corps where conservation measures should be taken and where recreational uses should be provided, a Citizen's Advisory Committee for Conservation has been organized.

The Advisory Committee urges all individuals and organizations who share its concern to circulate the questionnaire among its members. June 1 is the deadline for return of the questionnaire to:

DEPARTMENT OF THE ARMY
Chicago District Corps of Engineers
219 South Dearborn Street
Chicago Illinois 60604

Please note that everyone who completes the questionnaire will be informed about future workshop meetings of the Citizens' Advisory Committee. Also they will be invited to participate in evaluation of final results of the Corps study.

Thank you for your cooperation.

Sincerely yours,

J. F. Snaw
/ VICE CHAIRMAN

for Mrs. Lee Botts
Executive Secretary, Lake Michigan Federation, Chairman, Citizens' Advisory Committee for Conservation
Chicago-South End of Lake Michigan Wastewater Management Study

Attachment I-4

Conservation Inventory and Needs

The purpose of this questionnaire is to provide input for the Corps of Engineers, Chicago District's wastewater management study. The questionnaire is designed to determine what types of conservation and recreational programs should be considered for specific locations within the study area. See attached map. A separate questionnaire should be completed for each location involving the natural features and recreational usages you recommend. The questionnaire together with any additional comments should be forwarded to the District Engineer, U. S. Army Corps of Engineers, Chicago District, 219 South Dearborn Street, Chicago, Illinois, 60604 where more copies also can be obtained.

To provide for a follow-up contact by the Corps during its study please fill out the following:

Name (Individual or Organization): ____________________

Address: ____________________ ____________________

Telephone No.: (home)____ - ________ (office)____ - ________ ext.____

A. Desired Land Conservation Programs. (One form per site please)

1. Site Location: ____________________
2. Projected Usage (check usage(s) you recommend):
   a. Purpose for preservation:
      i. aesthetics........................______
      ii. historical........................______
      iii. wildlife management................______
   b. Potential recreational usage (specify)____________________
   ____
   c. Other possible uses (specify) ____________________
   ____
3. Required acreage____________________
4. Current land usage____________________
____

B. Desired Stream Improvement Programs: (one form per stream please)

1. Stream name: ____________________
2. Stretch of stream involved: ____________ to ____________
3. Present usage: ____________________
4. Projected usage (indicate priority ranking): ____________
____
5. Existing problems (check where applicable):
   a. Poor water quality.......................______
   b. Algae growth.............................______
   c. Siltation................................______
   d. Flooding.................................______
   e. Debris (natural or man-made).............______
   f. Bank erosion.............................______
   g. Fishery population: (indicate species)
      i. excellent to good ________ ________ ________
      ii. good to fair ________ ________ ________
      iii. poor ________ ________ ________

6. Is flow adequate during recreational season (May thru Oct.)?
   Yes ______ No ______

7. Possible in-stream improvements that should be considered (per stream; stream reach location).
   i. low-water dams ____________________
   ii. riffles ____________________
   iii. wing deflectors ____________________
   iv. deep pool (excavations) ____________________
   v. beaches ____________________
   vi. bank fishing sites ____________________
   vii. boat launching/take-out points (float trips) ________
   ____
   viii. stream use zoning ____________________
   ix. related planting programs ____________________
   x. other (specify) ____________________
   ____

C. Other Programs.

1. Existing impoundments/lagoons:
   a. Clean-out (indicate type of problem) ____________________
   ____
   b. Improvement of water quality (indicate type of problem)
   ____
   ____
   c. Enlarge capacity ____________________
   ____

2. Recommended new improvements:
   a. Location and size (acres) ____________________
   ____
   b. Proposed usage ____________________
   ____

D. Other Comments: ____
____
____
____
____
____
____
____

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

NCCPD

As part of the plan-formulation process for the Chicago-South End of Lake Michigan wastewater management study there is a need to (1) assess the present and future water needs of the area including those of commerce and industry, (2) integrate the collection and treatment of all waste loads into a regional system, and (3) provide for the effective handling and disposal of the resultant (treatment) sludge and polluted (stream) dredgings. Implicit in the system(s) design will be the dual concern for not only achieving economical efficiencies, but also a balanced program for the effective conservation of the area's water and land resources.

It is within this context, that we are soliciting your assistance by requesting responses to the attached questionnaire. Your participation is greatly appreciated.

Sincerely yours,

Richard M Wells

RICHARD M. WELLS
Colonel, Corps of Engineers
District Engineer

1 Incl
as

Industrial Inventory and Need Assessment

Name of Company:

Liaison Designate: (Name, Telephone Number)

A. Present Operations (for each plant)

1. Type of Industry or commercial activity (separate subsidiary operations)

a. Steel
b. Petroleum
c. Pharmaceutical
d. Chemical
e. Edible Oil or Food Processing
f. Commercial Navigation
g. Utilities
h. Aggregate & Mining Operations
i. Others (specify)

2. Water Usage Considerations (under current State/Federal-State Standards)

a. Is treatment of supply required? If so, specify extent, constituent control, and how attained.
b. Source of supply (*indicate MGD per category*): municipality, groundwater, other (specify)

3. Waste Load (under current State/Federal-State Standards)

a. Disposal of Sludge

i. Present method of disposal: liquid; solids
ii. Location of disposal or discharge site(s)
iii. Unit cost for disposal per volume or weight: capital; O&M

b. On-site considerations

i. Extent of recycling and/or treatment being utilized prior to disposal
ii. Future plans for recycling
iii. Potential interest in constituent(s) recovery from waste loads

B. Potential for Operational Changes

To evaluate the most effective system for implementing the proposed higher national water quality goals, necessitates adoption of realistic design and performance guidelines. These guidelines must be reflective of the users' requirements and feasible of being attained.

A minimum list of constituents and residual levels being considered for achieving the national goal is attached for use only in conjunction with this questionnaire. Based on this listing; your answers (opihion) to the following are required to develop local strategies for future wastewater management.

1. What changes, if any, would result in your current:

   a. Water Usage (see A2 above)
   b. Waste Load Aspects (see A3 a&b above)
   c. Industrial process and operations

2. Would the program of water recycling become more integral to your operations? If so, state how.

3. Would it be appropriate to assume that by 2020 there would be no industrial or commercial discharging of process water or blow-down flows to surface water in the study area and that industrial residual or blow-down water will be discharged to a municipal or regional collection system?

4. As a secondary consideration would the recovery of specific waste constituents become more economically feasible. If so, to what extent?

5. Aside from the financial aspects, what concerns if any, would adoption of the higher national goal impose on your operations?

C. Land-Use Potentials for Waste Handling

1. Availability of land for sludge/dredging disposal

   a. Location(s): present; future
   b. Site(s) acreage
   c. Site characteristics (topography; drainage; soil type etc.)

2. Potential for reuse of waste material

   a. Fill
   b. Rehabilitation (land restoration to higher use)
   c. Other (specify)

3. Constraints on use of land for waste disposal

a. Ownership
b. Zoning
c. Public Acceptance
d. Site usage (operational and others)
e. Other (specify)

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

STAGE I - PART 2

SECTION II

CITIZENS ADVISORY COMMITTEE
CONSERVATION AND ENVIRONMENTAL INTERESTS
(Summary - First Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

12 APR 1972

PREFACE

The U. S. Army Corps of Engineers, Chicago District, as part of its public involvement program for the Chicago-South End of Lake Michigan wastewater management study, conducted a series of introductory meetings with various local interest groups.

The first meeting, involving those citizens concerned with conservation, recreation and enhancement of the environment, was held on 12 April 1972 at 37 South Wabash Avenue, Chicago, Illinois. The purpose of the meeting was to help form a Committee which would serve in an advisory capacity to the District and provide input to the study. In its advisory capacity, the Committee will participate in the planning and screening processes, making known their position on all issues. Concurrently the Committee will also identify the types and location of specific conservation and recreational programs which should be considered in the formulation of viable alternatives. The alternatives would be designed to achieve not only the technical and environmental goal of "No Discharge of Critical Pollutants" but also a balanced and effective (treated) water and land related resource development program. A summary of the meeting is presented herein.

INVITATION LIST

CHICAGO - SOUTH END LAKE MICHIGAN STUDY

CITIZENS ADVISORY COMMITTEE FOR CONSERVATION AND ENVIRONMENTAL INTERESTS - FIRST MEETING

Organization and Representative Invited	Representative Attended
Illinois Izaac Walton League Mr. Elmer Johnson	
Illinois Audubon Society Mr. Harry V. Bierma	Mr. Harry V. Bierma
Save the Dunes Council Mrs. Jack M. Troy	
Sierra Club, Great Lakes Chapter Mr. Richard Wasson	
Open Lands Project Mr. Gunnar Peterson	
Citizens Action Program Mr. Paul Booth	
Illinois League of Women Voters Mrs. Louise Rome	
Businessmen for the Public Interest Mr. Alexander Policoff	
Cook County Clean Streams Committee Mrs. Mary Boyer	Mr. Jack Snarr*
Northwestern Students for a Better Environment Mr. Hal J. Bohner	Mr. Hal J. Bohner
Illinois Wildlife Federation, Cook County Division Mrs. Randall Herman	Mrs. Randall Herman
Illinois Wildlife Association Mr. Ace Extrom	
Committee on Lake Michigan Pollution Mrs. Eileen L. Johnston	Mrs. Eileen L. Johnston

Lake Michigan Federation Mrs. Lee Botts	Mrs. Lee Botts
North Branch Coalition Mr. Ralph Frese	
Cook County Clean Streams Commission Mr. Jack Snarr	Mr. Jack Snarr
American Association of University Women-Illinois Chapter Mrs. Mary Eleanor Wall	Ms. JoAnn Horowitz
Land Use Study Mrs. Donna Schiller	Mrs. Donna Schiller
Lake County League of Women Voters Mrs. Joseph Sobek	
Legislative Commission of NIPC State Representative Eugene F. Schlickman	Mr. Edward Kokkelenberg
DuPage County Clean Streams Committee Mr. Victor Goldfarb	
Citizens Association to Reverse Pollution Mrs. Helen Hoock	
Society Against Violence to the Environment Mr. Jack Mattox	
Illinois Federation of Sportsmen's Clubs Mr. Ralph Smith	
The Nature Conservancy, Illinois Chapter Mr. Cyrus Mark	
Illinois Planning and Conservation League Mr. Douglas Schoeder	
Sand Ridge Audubon Mrs. Helen Meier	Mrs. Helen Meier
DuPage Environmental Council Mrs. Jane Hickman	

Clean Air Coordinating Committee Mr. John Kirkwood	
Little Calumet River Assn. Mr. Joseph T. Chantigney	Mr. Joseph T. Chantigney
DuPage Council Clean Water Mr. Donald J. Newman	
Friends of the Earth Mrs. Mary Slingerland	Dr. Marilyn A. Domer
Illinois Prairie Club Ms. Lilian D. Lasch	Ms. Lilian A. Lasch
The Prairie Club Mr. Eugene Dissette	Ms. Lilian A. Lasch*
Ind. Izaac Walton League Mr. Charles W. Wiseman	
Ind. League of Women Voters Mrs. Donald Trump	
Ind. League of Women Voters Mrs. Donald W. Meier	Mrs. Donald W. Meier
American Youth Hostels	Mr. Dennis Burmeister
Army Corps of Engineers, Chicago District	Colonel Richard M. Wells Major Leroy R. Hayden, Jr. Lt. Thomas Blankenship Mr. James M. Maas Mr. Carl W. Hessel Mr. William H. Sanders, III

* dual representation by attendee of invited groups.

QUESTIONS, ANSWERS, AND DISCUSSION

Questions, answers, and comments following the briefing are summarized below.

Q: In light of the number of groups formed, who will reconcile the possible divergent viewpoints?

A: The Corps will be responsible for reconciliations should conflicts evolve; however, if joint committee meetings are deemed necessary by the Committees, such reconciliation can be obtained in these special meetings.

Q: Is the presentation and emphasis the same at all committee meetings of different interest groups?

A: Essentially the presentations will be the same, with minor variations. Separate groups are intended to obtain undiluted viewpoints.

C: The environmental and conservation interests may not want the Corps to reconcile differences amongst groups.

Q: Will the study establish priorities on particular streams?

A: The "No Discharge of Critical Pollutants" standard is designed to improve all streams; however, the check list [reuse sheet - attachment II-3] might indicate areas for emphasis.

C: The check list is almost verbatim of activities in the Little Calumet River study undertaken during the past two years, with some germane additions.

A: The study will identify needs to implement programs for the entire study area.

Q: Is public involvement a new policy?

A: No, such involvement is the Corp's of Engineers policy.

Q: How is implementation of plans handled?

A: Implementation will be at the local level. The Corps study is a planning service to local and State agencies.

Q: Will the Corps be required to file an Environmental Impact Statement?

A: Yes, it will be done concurrently with the study.

Q: Can the study be done in such a short time?

A: Yes, it can. There exists much basic data which can and will be utilized.

Q: How does the Corps get all cities (etc.) to agree to the final plan?

A: We cannot hope to get universal agreement, but we can recommend the best plan(s), and trust that the results of our study will be supportive. In addition, we have initiated coordination with numerous Federal and State agencies. The resultant assistance should help us produce a viable plan.

Q: What is the Committee expected to provide and how is the Committee to function?

A: We expect the Committee to make specific comments, e.g., design suggestions. The Committee may draft a position report and include a minority report, if desired. We would like such a report, for example, when establishing and screening the alternatives. This will both identify needs and problems and stimulate innovative problem solving. In planning for the optimum use of our natural resources, we must consider bottom deposits, canoeing, launching sites, etc., and reflect the interests of various geographic locations. We realize the study cannot solve all the problems, but such a comprehensive study will consider a broad range of concerns.

C: Many of these problems are local rather than regional.

A: The local problems, viewed together, constitute the regional problems.

Q: We Committee members are not experts on many items. How can we say, for example, if it is best to dredge or not?

A: The Corps has the expertise or will seek assistance from others to resolve such problems.

Q: Will the study consider Lake Michigan, vessels, and thermal pollution?

A: Yes, it will address this problem; we will use the best available information, which indicates that through non-structural means (i.e. regulations), these sources will be eliminated as pollutants of Lake Michigan.

SELECTION OF CHAIRMAN

Colonel Wells suggested a chairman and a vice-chairman be selected to conduct subsequent meetings and establish the Committee as an autonomous entity. After each attendee gave a brief statement of organization affiliation and position, Mr. Joe Chantigney, Mr. Jack Snarr, Mrs. Lee Botts, and Mr. Harry Bierma were nominated. Mrs Botts was elected by ballot and assumed the chairmanship. Mr. Snarr, the second highest in the balloting, was appointed vice-chairman. Members were assured administrative support of the Corps.

COMMITTEE PROCEEDINGS

Mrs. Botts acknowledged the opportunity for study input offered by the Corps in establishing the Committee, and inquired as to how the Committee would function over time. The chairman requested volunteers to distribute the Corps questionnaire and expand membership, if the Committee so desired. Colonel Wells read the list of organizations invited to participate on the Committee and indicated support from the Corps in printing and mailing newsletters and minutes of Committee meetings.

Dr. Marilyn Domer volunteered to be the recording secretary and recorded the remainder of the meeting (Attachment III-1). The functions of the Committee were discussed; particularly, whether the members have to report back to organizations or act as individuals. Some members indicated inability to speak for their organizations without prior discussion and consideration. Colonel Wells added that the members were invited as individuals with knowledge and experience in ecological concerns who could reflect the opinions of an organization without committing that organization. The individual's opinions and concerns relative to the study's finding were of major interest. Naturally it would be valuable if the Committee minutes would include pros and cons on any particular issue.

In discussing organizational procedures, Committee members decided to act as liaison between their respective organizations and the Committee. In addition, the Committee would convene informal meetings as necessary to supplement the formal meetings. It was also decided that the initial Committee tasks would be to gather information and distribute the Corps' questionnaire.

Interest was expressed in having a representative(s) from the Committee attend, as an observer, the other advisory Committee meetings, and in turn invite their similar participation. Colonel Wells indicated such an arrangement would require approval of the other Committees, and he would present the proposal at subsequent meetings scheduled for the near future. With no further discussion, Chairman Botts adjoined the meeting.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

STAGE I - PART 2

SECTION III

CITIZENS ADVISORY COMMITTEE
COMMERCE AND INDUSTRY
(Summary - First Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

PREFACE

The U. S. Army Corps of Engineers, Chicago District, as part of its public involvement program for the Chicago-South End of Lake Michigan wastewater management study, conducted a series of introductory meetings with various local interest groups.

One of the meetings involved representatives from the major commercial and industrial entities in the study area, particularly those directly or indirectly concerned with water and land usage. This meeting was held on 18 April 1972 at the Everett M. Dirksen Building, Chicago, Illinois. The purpose of the meeting was to form a committee which would serve in an advisory capacity to the District and provide input to the study. In its advisory capacity, the Committee will participate in the planning and screening processes, making known their position on all issues. In providing study input, the Committee will assist the Corps in projecting trends in industrial and commercial water usage and recycling, on-site waste treatment, sludge disposal and the economics implicit therein. These design factors will be evaluated for future conditions under both the current water quality standards and those for the higher quality goal of "No Discharge of Critical Pollutants". A summary of the meeting is presented herein.

SECTION III

INVITATION LIST

CHICAGO - SOUTH END LAKE MICHIGAN STUDY
ADVISORY COMMITTEE FOR
COMMERCE AND INDUSTRY - FIRST MEETING

Organization and Representative Invited	Representative Attended
Mr. Lester B. Knight, Chairman Lester B. Knight & Associates, Inc.	Mr. C. F. Knight
Mr. B. J. Yarrington, President American Oil Company	
Mr. C. J. Gauthier, Chairman, President, & C.E.O. Northern Illinois Gas Company	Mr. H. G. Harper
Mr. Lester Crown, President Material Service Corporation	
Mr. James C. Downs, Jr., Chairman Real Estate Research Corp.	Mr. Vernon E. Swanson
Kenneth W. Hamming, Senior Partner Sargent & Lundy	Mr. A. F. Aschoff
Mr. Philip M. Klutznick Chairman of the Board Urban Investment and Development Co.	
Mr. Reynold C. MacDonald President and C.E.O. Interlake, Inc.	Mr. Frank Armour Mr. T. R. Kinney
Mr. Donald O'Toole, President Financial Management Associates, Inc.	
Mr. John S. Reed President and C.E.O. Atchison, Topeka & Santa Fe Railway Co.	Mr. L. W. Cantwell Mr. William S. Tuinstra
Mr. Daniel C. Searle, President and C.E.O. G. D. Searle & Co.	Mr. Willaim D. Hull
Mr. Michael Tenenbaum, President Inland Steel Company	Mr. John R. Brough

Mr. Maynard P. Venema, Chairman Universal Oil Products Company	
Mr. Edward C. Logelin, Vice President Midwest United States Steel Corp.	Mr. E. C. Logelin
Mr. Arnold Sobel, Exec. Vice President Material Service Corp.	
Mr. Kline Weatherford, President Morton Salt Company	Mr. John M. Page
Mr. Thomas G. Ayers, President Commonwealth Edison Co.	Mr. Harold L. Koenig
Mr. Arthur Rubloff, Chairman Arthur Rubloff & Co.	
Mr. Charles R. Walgreen, Jr. Chairman-Retired Walgreen Co.	
Mr. George E. Dirkes, Executive Director Illinois Association of Aggregate Producers	Mr. George E. Dirkes
Mr. Otis Gibson, President Mid-West Coal Producers Institute, Inc.	Mr. Clarence W. Klassen
Mr. Dean Mitchell, Chairman Northern Indiana Public Service Co.	Mr. Dean H. Mitchell Mr. J. A. Pelletier
Mr. Ruel F. Lehman Asst. Vice President The Peoples Gas Light & Coke Co.	
Mr. Fred L. Shanklin Reg. Vice President Union Carbide Corporation	Mr. Donald K. Hackenberry
Mr. R. T. Cubbage Asst. Vice President & General Council Burlington Northern, Inc.	Mr. Barry Gutterman Mr. R. V. Gilbert
Mr. Laurence R. Lee V.P., Secretary & General Council Abbott Laboratories	Mr. David Schwarz

Mr. Herbert V. Prochnow, President (Ret.)
The First National Bank of Chicago

Mr. John D. Taylor, Manager
Chicago Area Stores
Sears, Roebuck and Co.

Mr. O. Everett Swain, President
Kraft Foods, Division of
Kraftco Corporation

Mr. Stanley E. G. Hillman
Executive Vice President
IC Industries — Mr. Donald Nord

Mr. Lou Bacon
P&W Engineers, Inc. — Mr. Fred W. Rohr

The Quaker Oats Co.
Merchandise Mart Plaza — Mr. L. W. Michael

Mr. Edwin J. Ballard
Executive Director
Calumet Area Industrial
Development Commission — Mr. Gerald L. Spaeth

Standard Oil Co. (Ind.) — Mr. R. C. Mallatt

QUESTIONS, ANSWERS AND DISCUSSION

Following the presentation, questions were asked and comments raised. The ensuing discussion is summarized below.

Q: How many other regional studies are now underway?

A: Five pilot studies are currently underway - Cleveland, Detroit and Chicago on the Great Lakes, San Francisco, and the Merrimack River Basin near Boston; others may be initiated in the near future.

Q: Are the answers to the questionnaire to be confined primarily to the study area, or to other geographical areas of interest?

A: Information on plant operations and sites outside the study area will be useful to either indicate an industrial trend or potential land disposal sites. The prime interest, however, is the study area.

Q: What is the "target date" for reply to the questionnaire?

A: We would like the information as soon as possible; hopefully within the next two or three weeks.

Q: Would it be helpful to have a company representative discuss the questionnaire with the Corps?

A: Yes, such a discussion would be desirable and would help you complete the questionnaire expeditiously.

Q: What effect will the study have on Clean Water Bills currently under Congressional review?

A: It will have no affect on these Bills, nor is it intended to influence this legislation. It is possible that the study results may affect future legislation, but the study will not be completed until March 1973.

Q: Congress has authorized a National Academy of Science study of the feasibility and cost of alternative wastewater management systems. Does the U. S. House of Representatives version of this legislation represent a duplication of the Chicago study?

A: The results of the Chicago study may well be used as input to the Academy study.

Q: What criteria was used to identify critical pollutants?

A: The list of critical pollutants attached to the handout [attachment I-5] is a minimum list of what we consider the most significant design parameters.

Q: What is the source of the pollutants and control levels identified in the minimum list?

A: The list was prepared by a consultant in cooperation with the Office, Chief of Engineers, to meet the language of the Muskie Bill.

Q: Does the Corps desire comments on standards?

A: Yes we do; we are especially interested in the cost to achieve the standards.

Q: Do you desire input from companies that do not have sites in the study area?

A: Yes, such information could prove beneficial to the study.

Q: What distribution should be given to the Industrial Inventory of Needs questionnaire?

A: We would like to rely on the discretion of this Committee as to the distribution. The questionnaire can be reproduced in numbers to meet your needs.

Q: What type of information is desired in response to the questionnaire - quantitative or qualitative?

A: We are seeking quantitative information such as current and projected water usage, effluent loadings, effluent discharge rates, etc. We are also interested in qualitative data such as possible trends; on industrial recycling, on-site treatment, and the economic feasibility of constituent recovery from waste loads, etc.

Q: Was not some of the information requested on the questionnaire submitted to the Corps previously a part of its Permit Application program?

A: We attempted to avoid such duplication. Some information may still seem similar; however, the Permit Application program is concerned with just those industries discharging directly to the streams. The program does not consider those industries discharging to municipal facilities, nor the portion of flow to municipal systems of those industries discharging partially to municipal facilities. It is to these latter industries that this questionnaire is directed.

Q: Why is ground water omitted from the questionnaire?

A: Ground water is listed as a source of water on the questionnaire.

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QUESTIONS, ANSWERS AND DISCUSSION

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Q: Why is ground water omitted from the questionnaire?

A: Ground water is listed as a source of water on the questionnaire.

Q: Does the study consider deep well disposal?

A: Yes, it does; we are looking in addition at many other aspects of ground water.

Q: At what point on the study approach slide shown earlier [attachment I-2] are costs incorporated?

A: Costs will be an integral part of each phase of the study.

Q: Then why does the questionnaire, question number 5, page 2 under B, instruct us to disregard costs?

A: We realize that cost is an important consideration, and it will be evaluated as indicated. However, the intent of the question was to determine any additional impacts adoption of the higher national goal may impose on your operations.

COMMITTEE PROCEEDINGS

With no further questions, Colonel Wells explained the Corps' intent to establish an independent advisory committee that would conduct its own meetings and reflect the concerns and opinions of commercial and industrial interests. Consequently, the attendees selected a chairman, Mr. Clarence Klassen, representative of Mid-West Coal Producers, Inc. In addition, Mr. Orville V. Bergren, Executive Vice-President of the Illinois Manufacturers Association, and Mr. Preston E. Peden, Director of the Governmental Affairs Division for the Chicago Association of Commerce and Industry, were elected in absentia for the positions of vice-chairman and committee secretary, respectively. [Note: Subsequently, Messrs. Bergren and Peden were advised of their election and indicated their acceptance.]

The Committee members then established an Ad Hoc subcommittee to work directly with the Corps and provide specific input to the study. Representing the main water users in the study area, the subcommittee would serve in a specific liaison function and identify realistic water usage and recycle trends, costs and operational requirements that would conceivably occur under the proposed quality standard of "No Discharge of Critical Pollutants". These projections would be reviewed and incorporated in the design of the alternative wastewater management systems. Elected to the Ad Hoc subcommittee were:

Mr. David Schwarz of Abbott Labs, representing the pharmaceutical Industry.

Mr. Harold Koenig of Commonwealth Edison Co., representing the Energy Producers.

Mr. Russell C. Mallatt of Standard Oil Co. (Ind.), representing the Petroleum Industry.

Mr. George. E. Dirkes, Executive Director, representing the Ill. Assoc. of Aggregate Producers.

Mr. Edward Logelin of U. S. Steel Corp., representing the Steel Industry.

Colonel Wells then informed the Committee of a suggestion offerred by the Advisory Committee for Conservation and Environmental Interests. The suggestion entailed an exchange of "observers" at each of the other's regularly scheduled meetings. This would provide a viable form of communication and facilitate the interaction of the various committees. The Committee for Commerce and Industry concurred and suggested that the minutes of each committee also be made available.

The distribution of the questionnaire was again discussed in more detail. It was suggested that expansion of the mailing list be first discussed with the Vice-Chairman and Secretary and if necessary the individual Committee members. Also the Corps should consider using its permit application

program listing as an additional source. Col. Wells stated that the permit application program excludes those industries that discharge to municipal facilities and further the Corps would like to rely on the judgment and good offices of Committee members in contacting other industries. [Immediately following the meeting, Mr. Klassen indicated the Committee would require assistance from the Corps to establish the mailing list for key industries].

Members of the Committee requested and were assured that they would be provided: a list of the Steering Committee members; the attendance list for the present meeting; a tentative schedule of meetings (flow diagram); and a summary of the meeting.

The final question concerned the "range of options" that the study would address in developing alternatives, and whether or not the Corps would look toward a regional collection and treatment system. Colonel Wells explained that the study will begin by examining a wide range of wastewater treatment alternatives, including considerations for economies of scale (regionalization). Alternatives spanning the range from a large number of small sewage treatment plants, to a small number of large sewage treatment plants will be considered.

Following the motion and second from the floor, Chairman Klassen adjourned the meeting.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

STAGE I - PART 2

SECTION IV

CITIZENS ADVISORY COMMITTEE
LOCAL PLANNING ORGANIZATIONS AND SANITARY DISTRICTS
(Summary - First Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

PREFACE

The U. S. Army Corps of Engineers, Chicago District, as part of its public involvement program for the Chicago-South End of Lake Michigan wastewater management study, conducted a series of introductory meetings with various local interest groups.

One of the meetings involved representatives from the local planning organizations and sanitary districts in the study area. This meeting was held on 2 May 1972 at the Everett M. Dirksen Building, Chicago, Illinois. The purpose of the meeting was to form a committee which would serve in an advisory capacity to the District and provide input to the study. In its advisory capacity, the Committee will participate in the planning and screening processes, making known their position on all issues. In providing study input, the Committee will assist the Corps in projecting trends in water usage, on-site waste treatment, sludge disposal, "state of the art" advanced waste treatment technology, and the economics implicit therein. These design factors will be evaluated for future conditions under both the current water quality standards and those for the higher quality goal of "No Discharge of Critical Pollutants". A summary of the meeting is presented herein.

SECTION III

INVITATION LIST
CHICAGO-SOUTH END LAKE MICHIGAN STUDY
ADVISORY COMMITTEE FOR
LOCAL PLANNING ORGANIZATIONS AND SANITARY DISTRICTS-FIRST MEETING

Organization and Representative Invited	Representative Attended
Mr. Ben Mc Evan, Manager Downers Grove Sanitary District	
Mr. Hugo Rimmke, Superintendent Joliet Sewage Treatment Plant	Mr. Richard D. Ciesla
Mr. Roger Bjorvik Cook County Council of Governments	Mr. John D. Crawford
Mr. Lyle Z. Dewitt Illinois Assn. of Sanitary Districts	Mr. John M. Harrat
Mr. Joseph Ratowski, Jr. Superintendent East Chicago Sanitary District	
Mr. James B. Gifford, Superintendent Michigan City Sanitary District	
Mr. Frank A. Patalono, Director Office Planning & Analysis Illinois State A-95 Clearinghouse	
Mr. Robert Gurnham Executive Secretary Lake County Planning Commission	Mr. Roy Adams
Mr. Charles Allen, Director Gary Planning Commission	Mr. Charles Dickens
Mr. Peter Enzweiller, President Salt Creek Drainage Basin Sanitary District	
Mr. Donald Eddy, District Manager Hinsdale Sanitary District	Mr. Donald Eddy
Mr. S. J. Kennedy, Manager-Engineer Wheaton Sanitary District	Mr. S. J. Kennedy
Mr. Ken Zweisel, Chairman Department of Community Development Naperville Planning Commission	Mr. Allen Panek
Mr. Tony La Rocca DuPage County Water Pollution Control Operators Assn.	

Mr. Jerry Estes, Director Lake County Regional Planning Commission	Mrs. Virginia Alexander
Mr. Mahlon Plumb City Engineer & Public Works Director	Mr. Merle W. Nicewander
Mr. Virgil O. King, President County Commissioner (Porter)	
Mr. John Esposito Director of Public Works	
Mr. Emil Beeg, Jr. City Engineer	Mr. Thomas J. Pappas
Mr. Gerald F. Johnson, Superintendent Hammond Sanitary District	
Director Indiana State A-95 Clearinghouse State Budget Agency	
Mr. Louis Barkmann, Sanitarian Morton Grove	
Mr. Paul O. Fisher Executive Secretary Planning Commission	
Mr. F. Leonard Coventry Superintendent Sanitary District of Gary	Mr. F. Leonard Coventry
Mr. Michael Meshenberg Planning Advisory Service Director American Society of Planning Officials	
Mr. Andrew Kuiters, Jr. Superintendent of Public Works Village of Lansing	
Mr. Fred Wilson, Foreman Homewood Sewage Treatment Plant	
Mr. John Iwena, Superintendent Village of Flossmore	
Corps of Engineers, Chicago District	Col. Richard M. Wells Maj. Leroy R. Hayden Mr. James M. Maas Mr. W. Henry Sanders, Jr. Mr. Milo Ryan

QUESTIONS, ANSWERS, AND DISCUSSION

Following the Corps' presentation, the meeting was opened to questions and comments. The ensuing discussion is summarized below.

Q: Col. Wells outlined the steps involved in performing the study and cited the ultimate study objectives. Can this study development and approach be simplified?

A: The study will address two basic problems whose solutions may prove beneficial. (1) It will first identify the costs involved in achieving the current standards and then determine the additional costs and resultant benefits in achieving the "No Discharge of Critical Pollutants" standards. (2) The study will quantify the costs of wastewater treatment facilities and operations more accurately than the present estimates that are available.

Q: We are concerned with the ultimate effect and result of the study on local planning districts. The constant expansion occurring in this area, with a daily change in availability of funds for wastewater treatment, further complicate the situation. If your study generates additional standards, will the current local plans have to be revised?

A: The Corps' study will not generate new standards. Rather, it will produce wastewater management plans that can be implemented if in fact the higher standards currently under consideration by Congress becomes law. Concomitant with these plans, additional plans will be developed to meet the current standards. This will insure a basis for comparison in defining the worth of the higher standards. If the higher standards do not become law, the plans for the current standards may be implemented.

Q: Is the Chicago study unique to the Corps, or are there others being done in the United States?

A: Our study is one of five pilot studies initiated last year. The others are in the New England Merrimack River Basin, Cleveland-Akron, San Francisco-Stockton, and the Detroit (Southeast Michigan) areas.

Q: Will the pilot studies be combined in a uniform code of state and federal guidelines?

A: No, the Corps' mission is not to develop national standards. Although other locales have requested and had approved studies of this type, there is no intention to encompass the United States with pilot studies.

Q: Is there any relationship between the Chicago study and the standards now being established?

A: Yes, the study will identify the different costs and benefits to be achieved under both the current standards and the higher standards now under consideration. We will in no way interfere with or duplicate the efforts of agencies presently involved in developing standards.

Q: Why is the Corps involved in wastewater management planning? Why should engineers be developing the framework to conduct the study?

A: Because of the Corps' unique planning experience and capability, we were given the mission by Congress to perform the pilot wastewater management studies. We were asked to employ a regional approach in considering the "No Discharge of Critical Pollutants". Such an approach is beyond the scope of present plans.

The framework plan for the development of alternatives provides guidance to the entire study team, not just the engineer whose role will be to identify the technical feasibility and design of systems. The Chicago District staff is comprised of a divergence of disciplines. Included are biologists, landscape architects, economists, etc., who will consider the non-engineering aspects of the study.

To further insure that we develop plans responsive to the total needs, we have contracted for a group of academicians to assist us in both development of the framework plan and the study.

Q: Will the study address financing, a major problem in all wastewater management program proposals?

A: We will approach some aspects of financing in the institutional portion of the study and perhaps make recommendations. We do not expect, however, that the study could or would produce any extensive analysis of local financing problems.

Q: How detailed will the financial aspects of the plans be?

A: The answer depends on the interpretation of the word financial. While the study will not indicate, for example, how local governments can obtain funds for a particular treatment plant, it will answer a "gross magnitude" type of question such as the total system cost, operation and maintenance costs, etc.

Q: In the process of developing alternatives, what is the basis for determining the approximate costs?

A: We have basic operation and maintenance cost data for various components of wastewater treatment facilities (eg., costs related to plant capacity, pipe line size required, etc.) Of course, one of our concerns and a reason we asked this committee to be formed is to insure that the cost data input to the study reflects the problems and costs that local institutions experience at the operating level. To this end we will be providing cost data and cost curves to the Committee for review. From your comments, suggestions for modifications, and supplementary data, we can determine if our cost data, which has been collected throughout the country, is valid in

this particular area. This committee can be instrumental in resolving such conflicts between cost data, should discrepancies become apparent.

Q: What are the critical pollutants?

A: We have identified a minimum list of 14 constituents (temperature, color, BOD, etc.) that will be "key" for system design. By eliminating these particular pollutants, nearly all pollutants should be removed. [See attachment II-1 for the minimum list of critical pollutants.]

SELECTION OF CHAIRMAN

To establish an independent committee whose study input reflects the concerns of local planning organizations and sanitary district, Col. Wells suggested the Committee elect officers. The official minutes of the meeting by the Committee would become part of the final report to show the members opinions and position on any particular issue [See attachment III-1].

Following the introduction of those present, Mr. John Harvat, president of the Illinois Association of Sanitary Districts, was nominated and elected chairman. Upon Mr. Harvat's suggestion, the Committee adopted a Co-chairman committee structure to insure representation from both States. Accordingly Mr. F. Leonard Coventry, Superintendent of the Gary Sanitary District, was elected to represent those members from Indiana. Subsequently, Mr. Stuart Kennedy was elected Committee Secretary.

Exhibit I

ALTERNATIVE PROCESS SYSTEM PERFORMANCE DATA

Effluent Quality

Treatment Type	COD mg/l	BOD_5 mg/l	Suspended Solids mg/l	Dissolved Solids mg/l	Soluble Phosphorus mg/l	NH_3-N mg/l	NO_3-N NO_2 mg/l	Organic N mg/l
Advanced Biological	10	3	1	350	0.1-0.2	0.3	2-5	~0
Chemical-Physical	10	3	1	350	0.1-0.2	0.5	2	~0
Land Treatment	6	2	~0	400	0.01	~0	2	~0

Treatment Type	Oils Greases mg/l	Phenols mg/l	Pathogens, Viruses	Trace Metals*	Boron	Arsenic	Cyanide
Advanced Biological	1	0.01	Present**	0.1	1.0	0.03	~0
Chemical-Physical	1	0.01	Present**	0.1	1.0	0.03	~0
Land Treatment	~0	~0	~0	~0	~0	~0	~0

*Trace Metals: Aluminum, Cadmium, Chromium, Copper, Lead, Nickel, Zinc, Iron, Manganese, Mercury

**Present with Current Disinfection Practice.

COMMITTEE PROCEEDINGS

Co-chairman Harvat requested suggestions on Committee activities or comments on the Corps study. Members questioned the availability and use to the Committee of the Feasibility report completed in July 1971. Discussion indicated that an in-depth perusal, especially of the cost data, was not necessary. Rather, it would be more beneficial for members to consider the Feasibility report as a framework and reference base for forthcoming studies. The members then decided to reconvene after reviewing the Feasibility report. [Copies of the report were given to members at the conclusion of the meeting.]

Members raised questions as to the basic function of the Committee. Col. Wells answered that the Committee's function was to provide advice that reflects the background and expertise of members. By establishing Advisory Committees, we hope to receive a broad cross-section of advice and ideas from the different sectors of the public. We realize of course that an essential input must be from those directly involved in the wastewater management program, such as operators.

All committees may assist us by actively participating in this plan-formulation process and in making known their viewpoints during the screening of the alternatives. At the inception of the study we will be making basic decisions by presenting a range of systems and costs to the committee and seeking your comments and concern. In this way each committee will provide input in the decision making process and help us determine future study activities. As the study progresses and the alternatives are refined, more specific recommendations and conclusions will be warranted. By incorporating the concerns of divergent viewpoints, we can develop alternative solutions acceptable to those residing in the area.

Mr. Harvat added that the Committee was convened for the members to meet, assess the overall problem, and determine a date to meet and review any information the Corps disseminates.

Col. Wells then informed the Committee of a suggestion offered by the Advisory Committee for Conservation and Enviromental Interests and later accepted by the Committee for Commerce and Industry. The suggestion entailed an exchange of "observers" at each of the other's regularly scheduled meetings. This would provide a viable form of communication and stimulate necessary interaction between Committees. The Committee for Local Planning Organizations and Sanitary Districts concurred, and added the option of sending observers only on a volunteer, availability basis. Members decided that an exchange of minutes would usually suffice for their Committee purposes. Col. Wells replied that such an exchange could be arranged, since all minutes become part of the report; however, he cautioned the membership on a time lag of information required to produce and distribute the minutes.

The District Engineer, queried about the time of the next meeting, replied that the specific date is dependent on study progress and will be coordinated with the Co-chairmen. Mr. Harvat added that the next meeting will be scheduled as input from the Corps is made available. [This information is currently being processed and will be forwarded shortly.]

Mr. Coventry concluded the meeting with a discussion of the changing state of standards, stating that a prime concern of the Committee is the identification of critical pollutants and the manageability of shifting standards. The Co-chairman suggested members consider these factors, especially the possible changing of Indiana standards, when reading the Feasibility report. Following these remarks, the meeting was adjourned.

WHEATON SANITARY DISTRICT

MAIL ADDRESS
P. O. BOX 626

TREATMENT PLANT
SHAFFNER ROAD

WHEATON, ILLINOIS 60187

OFFICE PHONE 312 668 1515

TREATMENT PLANT PHONE 668 1511

CITIZENS ADVISORY COMMITTEE
OF
LOCAL PLANNING ORGANIZATIONS & SANITARY DISTRICTS
CHICAGO-SOUTH END LAKE MICHIGAN WASTEWATER MANAGEMENT STUDY

Partial minutes of the first meeting held May 2, 1972 at 10:00 A.M. Room 504, 219 South Dearborn Street, Chicago, Illinois.

In response to letter invitation dated April 21, 1972, by Department of the Army, Chicago District Corps of Engineers, to twenty-nine local planning and sanitary districts, some twelve organizations' representatives responded.

A welcome, statement of purpose and request for organization was made by Corps personnel.

As a result of the request for organization, Mr. John M. Harvat, Trustee of the South Lyons Township Sanitary District was selected Chairman and Mr. F. L. Coventry, Superintendent and General Manager, Gary, Indiana Sanitary District was selected co-chairman or Vice-Chairman.

Chairman Harvat appointed Stuart J. Kennedy, Manager-Engineer, Wheaton Sanitary District as Secretary.

It was suggested and unanimously agree that:

1. Industrial representative be invited as an observer at all future meetings.

2. Minutes of this organization's meetings be exchanged with other proposed organizations or committees.

3. Representatives of this committee attend the other committee meetings.

4. "Alternatives for Managing Waste Water Report" copies distributed to all at this meeting by the Corps, to be studied as a starting point.

5. This group meet again at the call of the Chairman. No definite date.

May 26, 1972

S. J. Kennedy, Secretary

STAGE I - PART 3

Minutes

Steering Committee Meeting No. 1

STAGE I - PART 3

STEERING COMMITTEE MEETING NO. 1

Table of Contents

LIST OF PARTICIPANTS
STEERING COMMITTEE MEETING NO. 1
CHICAGO-SOUTH END LAKE MICHIGAN STUDY
18 FEBRUARY 1972

AGENCY	INVITEE	ATTENDEE
U. S. Environmental Protection Agency	Mr. Francis T. Mayo	Mr. Ray Ownbey Mr. J. T. Stetson
Interstate Planning Commission	Mr. William Kwan	
Metropolitan Sanitary District of Greater Chicago	Mr. Benjamin Sosewitz	Mr. Benjamin Sosewitz Mr. Forrest C. Neil
Northeastern Illinois Planning Commission	Mr. Matthew L. Rockwell	Col. Joseph A. Smedile (Ret.)
North Shore Sanitary District	Mr. H. William Byers	Mr. Jack W. Cormack
Sanitary District of Bloom Township	Mr. J. E. Meers	Mr. Al Pagorsk
Department of Water and Sewers, Chicago	Mr. James W. Jardine	Col. John Corey (Ret.)
Ill. Department of Business and Economic Development	Mr. R. Dickerson	Mr. Jim Webb
Department of Public Works, Chicago	Mr. Milton Pikarsky	Mr. Clint J. Keifer
Lake County Department of Public Works and Buildings, Illinois	Mr. Robert J. Degan	
Du Page County Public Works Department	Mr. Robert W. Hadley	Mr. Mervin Grant
Illinois Environmental Protection Agency	Mr. William L. Blaser	Mr. Richard S. Nelle
Illinois Institute for Environmental Quality	Mr. Michael Schneiderman	

AGENCY	INVITEE	ATTENDEE
Indiana State Board of Health	Mr. Oral H. Hert	Mr. Oral H. Hert
Joliet Department of Public Works	Mr. Bernie Berolla	
Indiana Department of Natural Resources	Mr. John R. Lloyd	Mr. Robert F. Jackson Mr. James O. Russell
Lake Porter County Regional Transportation and Planning Commission	Mr. Norman E. Tufford	Mr. Norman E. Tufford
Indiana Stream Pollution Control Board	Mr. Perry Miller	Mr. Perry Miller
LaPorte County Planning Commission	Mr. Earl L. Sauer	
Michigan City Planning Department	Mr. Charles Oberlie	
Corps of Engineers, Chicago District	Col. Richard M. Wells	Col. Richard M. Wells Maj. Leroy R. Hayden Mr. William J. Santina Mr. James M. Maas Mr. Carl Hessel Mr. Imre Szekelyhidi Mr. W. Henry Sanders, III
Bauer Engineering, Inc.	Dr. William J. Bauer	Dr. William J. Bauer Dr. Donald E. Matschke

Steering Committee Meeting No. 1
Minutes of Meeting

Briefing

Following the introduction of Steering Committee members and District Personnel, Col. Wells identified the purpose and intent of the meeting. Basically, the meeting served a dual purpose. First, the meeting was to convene the Committee, the function of which would be to provide guidance and necessary input to the study. Such input would ensure that the Corps' efforts in plan formulation are complementary to both States' efforts and federal requirements. Second, to brief the Committee as to the authority, objectives, approach, and conduct of the wastewater management study, all of which are summarized below.

Authorization for the C-SELM survey scope study was provided by Congressional resolutions from both the House and Senate Public Works Committees, copies of which are attached (attachments 1 and 2, respectively). The study area includes portions of four Illinois and three Indiana counties (see attachment 3) with major drainage to the Des Plaines River and to Lake Michigan.

The main objectives of the study are presented in Attachment 4. Of these, the overriding objective is to develop a series of alternative wastewater management systems that will meet projected 2020 needs with a technical goal approaching "No Discharge of Critical Pollutants." Within this context, the plan formulation process will ultimately identify the following end products (see attachment 5).

a. Costed and evaluated regional alternatives for meeting 1990 needs which are compatible with a framework plan for meeting 2020 needs.

b. Time phased early action program(s) for implementing the 1990 system(s).

An integral part of the plan formulation process will be the development of alternatives designed to meet current standards - but with the intent to determine the potential for regionalization and the opportunity for reuse. Study of these latter alternatives will permit us to establish a screening base and eventually differentiate the comparative worth of the higher standard. The screening base will be developed using the existing local wastewater management systems and facilities, and those under construction or expected to be on the drawing board by July 1973, as a common building block. All alternatives will be developed within the guidelines of the Federal Environmental Protection Agency, as well as other guidelines and constraints (see attachment 6).

The results should assist State and local agencies in several ways. First, the development of the screening base may identify improvement opportunities in current plans for meeting existing standards and show how such

improvements could be made without adverse impact on current programs. Second, in the event that higher standards currently under consideration by the Congress becomes Federal law, the study will identify optimal plans for achieving those standards, the costs involved, and the benefits that would accrue. Finally, the study may display technology not previously considered in State planning which could be used to advantage, regardless of the water quality standard finally adopted.

A range of differing alternatives will be developed; reduced in number by an evaluation assessment screening process; and those warranting further consideration refined during three distinct phases of technical studies (see attachment 7). Concurrently, environmental and institutional studies will be performed to assess the direct and indirect impacts of the alternatives on these particular aspects.

To assist the Steering Committee, Citizen Advisory (or Workshop) groups representing divergent viewpoints will be established to ensure that the plan formulation process is sensitive to a wide range of public and governmental concerns. To supplement the Steering and Citizen Advisory groups, a series of three public meetings will be held. Tentative milestone dates (handout) showing the schedule for accomplishing key technical work items and the interdependency with the Steering and Citizen Advisory Committee are shown in attachment 8.

The technical, environmental, and institutional studies have each been initiated. The data base phase of the technical studies has been completed and submitted in draft form for preliminary review by this office (Attachment 9, handout, lists the items included in the data base). An excerpt from this data base, "Population and Industrial Projections (Item 3, 5-6) was sent to all Committee members to indicate the type of information being generated and to solicit comments prior to formal coordination.

Discussion

A discussion period followed the presentation during which areas of concern, comments and suggestions were made.

Col. Wells invited comments on the "Population and Industrial Projections" previously sent Steering Committee members as an inclosure to the 11 February 1972 letter. Mr. Miller expressed concern with the amount of industrial flow reduction, notably the 80 percent reduction of the 356 MGD flow in Lake County, Indiana. Dr. Matschke replied that two basic industries (steel and petroleum) represent 90 percent of the industrial flow in C-SELM and hence were used appropriately to generalize the overall reduced industrial flow that could be expected under the proposed higher quality standards. For this reduction, assumptions were made considering current recycle efforts and technology of the two basic industries. The Chicago District will confer with the appropriate agency in Indiana to resolve the question of what amount of reduction to use in the study. Mr. Sosewitz, MSD, raised the same issue for Illinois; this will be resolved.

Discussion next centered on the possible disruption of local programs. Mr. Sosewitz stated that it makes sense to consider long range objectives (1977 in Illinois) in developing alternatives which could appreciably change current long range plans. He also suggested that a delay in key decision making relative to the current long range programs in the next 6-12 months could result in great savings. Col. Smedile added his concern of lost capital investment and of phasing the Corps' plan into existing facilities. In answer, Col. Wells affirmed instructions to the Chicago District to develop alternatives without providing interference or delays in implementing ongoing programs. Mr. Maas further explained that the study addresses these problems. As a base to begin implementation and phasing, those facilities existing, under construction, or in the final design stages by 1973 will be considered the starting point. Investment risks will be minimized by developing plans against a longer (year 2020) framework.

Mr. Tufford inquired about the Grant in Aid Program and regional plans, and their relationship to the Corps study, i.e., are the states, EPA, HUD, and Corps studies on the "same track". Further, will EPA and HUD evaluate the Corps plans (in terms of deficiencies, etc.), to satisfy their requirements?

Col. Wells explained that the Corps' study will address all existing planning efforts as part of the framework for fulfilling the requirements to meet the water quality standards. By working as closely as possible with the Steering Committee and other groups, the end product of the study will have maximum usefulness and could be utilized to whatever extent the individual State and local authorities may desire in satisfying federal programs. Mr. Ownbey added that the Corps was proceeding on its own initiative (in the study) and each agency will have to use its own judgement of the final product's usefulness. Submission of plans would still be by the certifying agencies (Mr. Miller and Mr. Blaser). Hopefully, the Corps' study will supplement State effort. The Steering group, as Mr. Ownbey stated, is indicative of this complementary effort.

Col. Smedile commented that there is another intermediate water quality standard (other than the two the study addressed): in between the Corps' options is another covered by the EPA Water Quality Management Planning Guidelines. He felt that the Guidelines require identification of all pollutants put into the basin (quantification, spatial location, etc.), development of a water quality model, and then use of the model to determine the degree of treatment needed. This degree of treatment would then be an intermediate water quality standard. Mr. Smedile stated that such a model could provide a real service if it could perform its function for river basins in this area.

Col. Wells replied that, while we have looked at the question of using a water quality model, we are not sure that the model will be useful in this metropolitan area; but we are quite sure that we could not perform such modeling due to time and funding constraints. We are definitely not in the water modeling business.

River basin models are prepared, Mr. Ownbey added, on a national scope, considering river basins as they might exist all over the nation. It is his feeling and the consensus of his colleagues that there are definite limitations on the applicability of modeling in this geographical area in which there is a high concentration of population and industry and the potential for discharge of waste at the headwaters of the water system. Water modeling as described in EPA Guidelines would apply to river basins like, e.g., New England, in situations where there are related but separated sources of pollution and where there is an opportunity to examine the possible economies to be achieved by tailoring the degree of treatment within the system. Here, in many cases there is no stream except the wastewater flow, hence modeling as related to assimilative capacity becomes almost irrelevant. As a technique for looking at this region as a whole, Mr. Ownbey stated that he does not think EPA personnel have seen any great potential for the river modeling technique as a solution to the problem.

Mr. Keifer pointed out the model used by the City of Chicago for the combined sewer area. He feels such a model could be expanded for the entire study area to determine the impact of continuous runoff, overflows, and droughts.

Mr. Ownbey noted that the main factor in this model is the primary importance of the combined sewer storm runoff in the Chicago area.

Dr. Matschke added that we will be grappling with the problem of storm runoff. There is a great need for this type (urban storm runoff) of modeling, hence we will do some modeling to establish equity of treatment between M&I flows and storm water treatment.

Further, Dr. Matschke stated, it has been his experience that modeling does not face up to such problems as eutrophication, algae growth, bottom deposits, etc. We end up modeling with respect to the basic effects of the effluent on the receiving water's conservative constituents and neglect the factors controlling eutrophication or other conditions. This is a real problem which must be addressed if modeling is to be meaningful.

Mr. Ownbey further added that the purpose of modeling for stormwater is to be able to compare some alternative schemes, not to allocate for the assimilative capacity of the streams. In many cases the wastewater flow is the stream.

Maj. Hayden addressed the problem of storm water runoff and inquired of the Committee the amount requiring treatment, noting the 1 inch approximation used in the feasibility study and the enormous quantities resulting from this assumption. The fact that combined sewer overflow would have to be treated evolved from the ensuing discussion, but the storm water issue remained unresolved.

Concluding Remarks

In closing, Col. Wells reiterated the Corps' cognizance of the differences on population projections and industrial flows and the intent to resolve:

(1) industrial flow projections, and

(2) amount of stormwater to be treated to (a) meet State standards and (b) meet the "No Discharge of Critical Pollutants" criteria.

When available, preliminary alternative wastewater management systems will be sent to Steering Committee members for comments prior to the next meeting.

The possibility of holding separate meetings for Illinois and Indiana was proposed. It was decided to hold a single meeting, since Indiana participants expressed minimal inconvenience in travel. Col. Wells adjourned the meeting and thanked attendees for their participation.

COMMITTEE ON PUBLIC WORKS
HOUSE OF REPRESENTATIVES, U.S.
WASHINGTON, D.C. 20515

RESOLUTION

Resolved by the Committee on Public Works of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors is requested to determine the advisability of improvements in the interest of wastewater management and alternatives thereto, in the Chicago, Illinois metropolitan area in connection with investigations authorized by Section 206 of the Flood Control Act of 1958.

Adopted November 10, 1971

Attest: John A. Blatnik
John A. Blatnik, M.C.
Chairman

Requested by: Hon. John A. Blatnik
Hon. William H. Harsha

Attachment 1

92nd Congress

1st Session

United States Senate

COMMITTEE ON PUBLIC WORKS

COMMITTEE RESOLUTION

RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE,

That the Board of Engineers for Rivers and Harbors is requested to determine the advisability of improvements in the interest of wastewater management and alternatives thereto, in the Chicago, Illinois metropolitan area in connection with investigations authorized by Section 206 of the Flood Control Act of 1958. In carrying out the aforesaid investigation, the Board shall evaluate general alternatives for the management of wastewater on a regional basis, including the elimination of pollutant discharges and shall conduct such investigation with the participation, consultation and cooperation of the Environmental Protection Agency and State and local water pollution control agencies and, where appropriate, State and local agencies with environmental planning responsibilities.

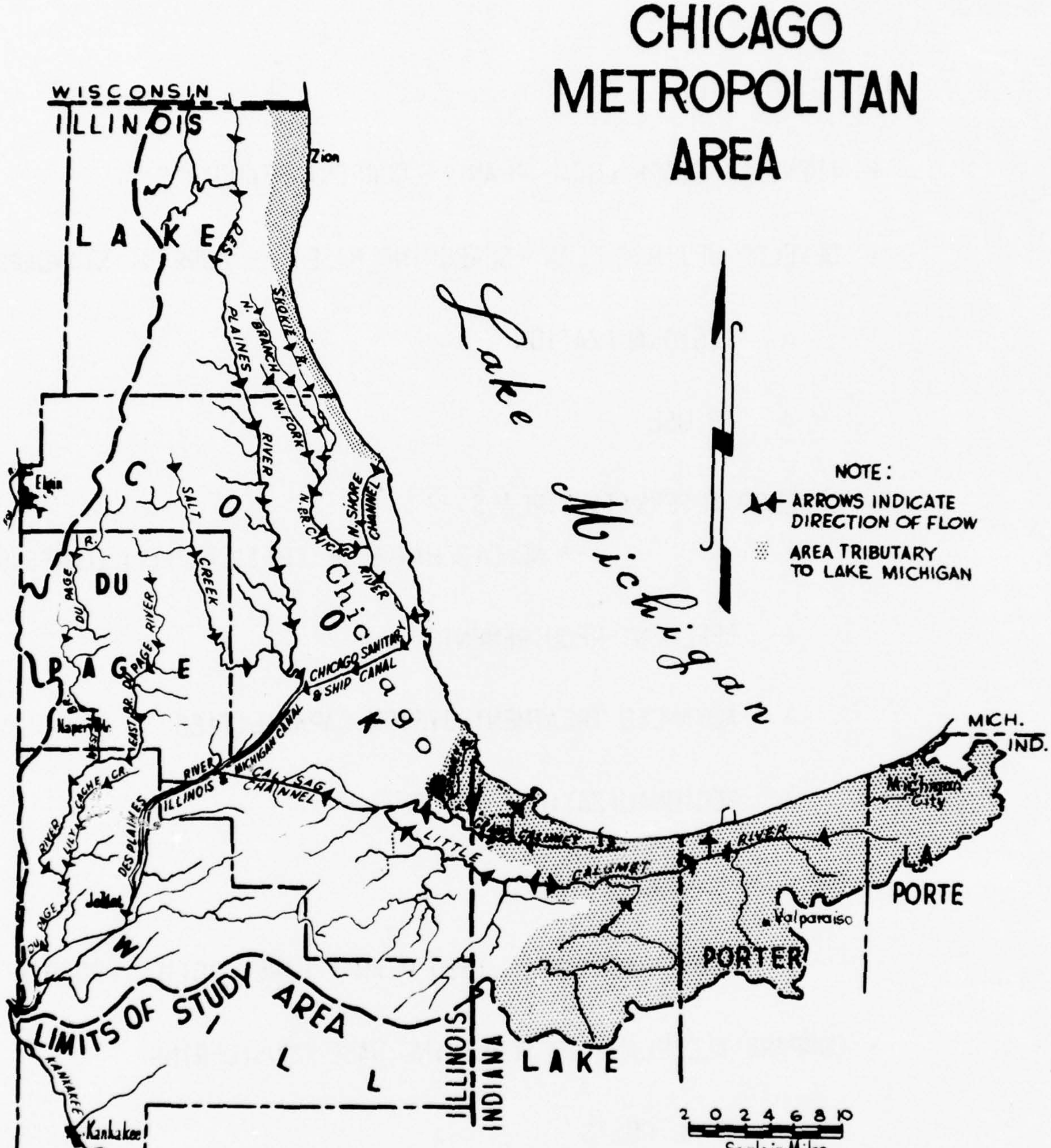
Adopted: November 23, 1971

Jennings Randolph

Jennings Randolph, Chairman.

(At the request of Senators Jennings Randolph, John Sherman Cooper, Edmund S. Muskie, and J. Caleb Boggs).

Attachment 2



Attachment 3

STUDY OBJECTIVES

THE STUDY WILL:

- IDENTIFY STATE/LOCAL PLAN -- CURRENT STANDARDS
- DEVELOP OPTIMUM PLAN (SCREENING BASE) -- CURRENT STANDARDS
  - Δ REGIONALIZATION
  - Δ RE USE
- DEVELOP ALTERNATIVE PLANS --
  -- NO DISCHARGE OF CRITICAL POLLUTANTS GOAL
  - Δ EFFLUENT REQUIREMENTS
  - Δ ADVANCED TREATMENT SYSTEM CAPABILITIES
  - Δ REGIONALIZATION / REUSE
- PROVIDE FOR ALL PLANS:
  - Δ 2020 FRAMEWORK / 1990 PLAN / EARLY ACTION PROGRAM
- COMPARE ALL PLANS TO SCREENING BASE CONSIDERING:
  - Δ TOTAL COSTS
  - Δ BENEFITS -- ECONOMIC, SOCIAL, ENVIRONMENTAL

Attachment 4

STUDY PRODUCTS

ALTERNATIVE PLANS	WATER QUALITY STANDARD
EXISTING STATE/LOCAL	CURRENT FEDERAL/STATE
OPTIMUM (SCREENING BASE)	CURRENT FEDERAL/STATE
2 OR 3 ALTERNATIVES	NO DISCHARGE CRITICAL POLLUTANTS

PLAN COMPOSITION:

- 2020 FRAMEWORK
- 1990 PLAN
- EARLY ACTION PROGRAM

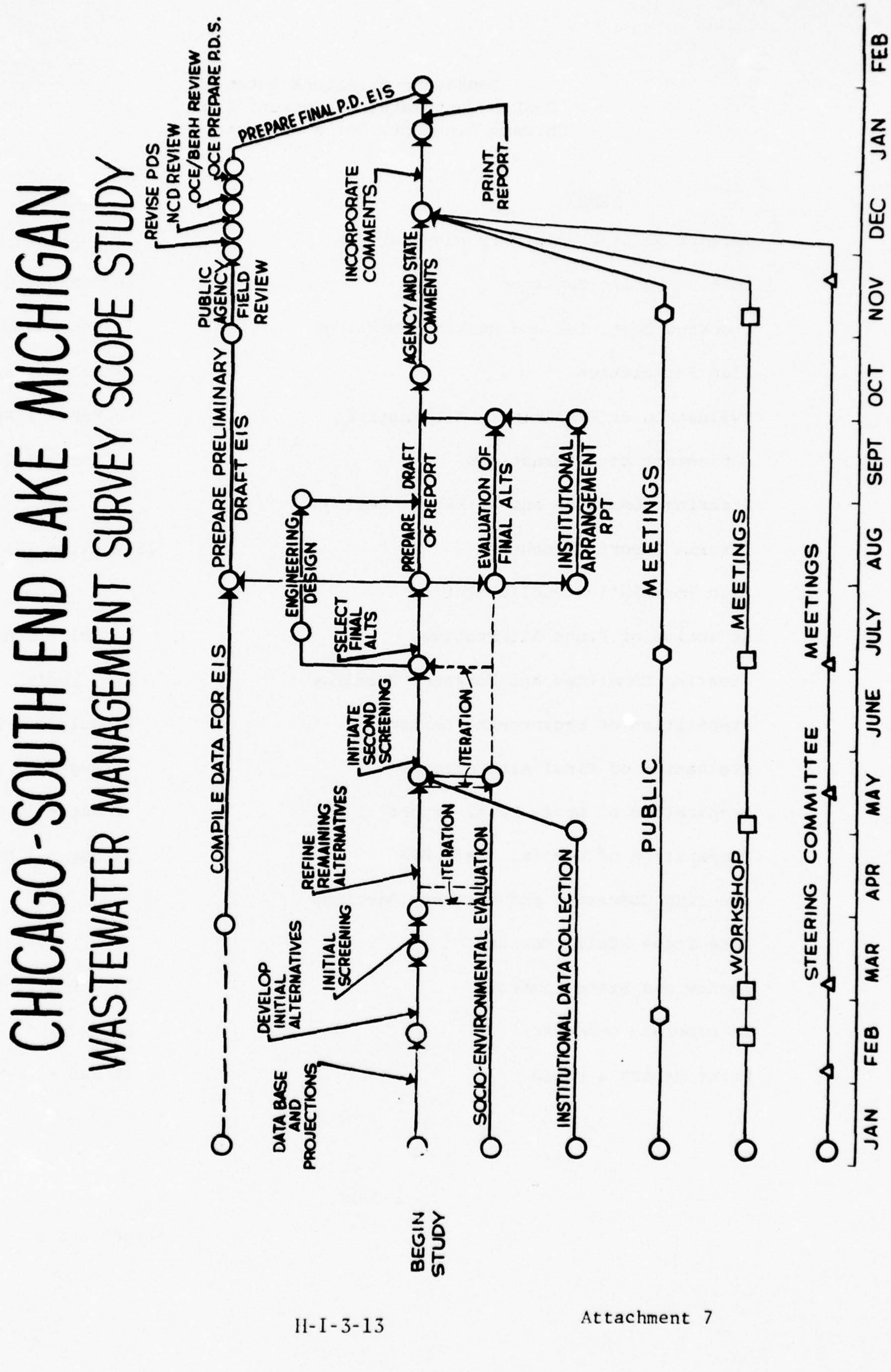
PLAN COMPARISONS:

- TOTAL COSTS
- TANGIBLE/INTANGIBLE BENEFITS

STUDY GUIDELINES & CONSTRAINTS

- BUILD ON ON-GOING PROGRAM
- NO DISRUPTION OF CURRENT PROGRAMS
- SERVICE TO STATES -- NO PRE-EMPTION OF STATE RESPONSIBILITY
- FISHBOWL PLANNING
- FEDERAL E.P.A. GUIDELINES
- FULL RANGE OF ALTERNATIVES
- CONSIDER ALL SOURCES OF POLLUTION
- ULTIMATE FATE -- ALL SOLID, LIQUID, GAS PRODUCTS
- LIMITED TIME AND FUNDS
- MINIMUM FIELD DATA COLLECTION
- PLANNING RESOURCES

Attachment 6



Attachment 7

Tentative Milestone Dates
C-SELM Wastewater Management Study
Chicago District, Corps of Engineers

Event	Date(s)
Definition of Preliminary Alternatives	1 Jan - 15 Mar
Initial Public Meetings	29 Feb & 7 March
Steering Committee and Workshop Meetings	Feb, March
Plan Formulation	1 Feb - 1 July
Evaluation of Preliminary Alternatives	8 Feb - 1 Apr
Refinement of Alternatives	1 Apr - 1 July
Steering Committee and Workshop Meetings	May
Interim Report (Brochure)	15 April - 1 June
Plan Formulation Public Meeting	June
Selection of Final Alternatives	1 Jul - 1 Aug
Steering Committee and Workshop Meetings	July
Preparation of Engineering Designs	15 July - 1 Sep
Evaluation of Final Alternatives	1 Aug - 15 Oct
Preparation of Draft Final Report	1 Aug - 15 Oct
Preparation of Prelim. Draft EIS	31 Aug - 1 Nov
Steering Committee and Workshop Meetings	Nov
Late Stage Public Meeting	Nov
Agency and State Comments	15 Oct - 15 Dec
Incorporate Comments	15 Dec - 15 Jan
Print Report & PDEIS	15 Jan - 1 Feb

Attachment 8

BACKGROUND DATA ITEMS

1	Minimum Hydrologic Flows
2-4	Inventory Municipal and Industrial Flows
3,5-6	Population and Industrial Projections
7	Inventory Storm Runoff
8	Chicago Storm Drainage Plans
9	Non-Structural Management Aids (Water Meters, Ban On Phosphate Detergent, Etc.)
10	Criteria for Septic Systems
11	Energy Forecasts (Power Generation Requirements, Etc.)
12	Critical Pollutant Loadings
13	Ultimate Water Quality (Characterization In Terms of Critical Pollutants, Effects, Etc.)
14	Water Supply and Recharge
15	Soil Process (Viability of Soil for Wastewater Treatment)
16	Irrigation Impact on Agriculture
17	Disposal Site Soils
18	Denitrification and Rapid Infiltration Ponds
19	Synergisms (Complementary Characteristics of System Elements)
20	Effluent and Water Quality Standards
21	Unit Costs and Performance
22	Bottom Deposits and Aquatic Surveys
23	OCE Stormwater Model
24	Design Criteria (For Engineering and Environmental Design)

Attachment 9

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

STAGE II: INITIAL ALTERNATIVES

The material presented herein is a summary of the interaction with the public during the second stage of the study. This stage is highlighted by development and screening of an initial set of 19 alternatives. The interaction is described in the summaries of committee meetings.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

CITIZENS ADVISORY COMMITTEES

(Summary - Second Meetings)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

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TABLE OF CONTENTS

Stage II

Initial Alternatives

SECTION I - CORPS OF ENGINEERS' PRESENTATION

INTRODUCTION

The meeting began with a status briefing by Col. Richard M. Wells and Dr. Donald Matschke of Bauer Engineering, Inc., a technical consultant to the Corps of Engineers for the Wastewater Management Study. Col. Wells outlined the progress to date and briefly described the nineteen alternatives that evolved from the first phase of the study. Dr. Matschke presented a detailed look at the nineteen alternatives, citing design considerations and assumptions, and included a description of reuse options. Col. Wells then presented a series of costs comparisons, highlighting the differences in costs for various components. He concluded the briefing by presenting an initial screening effort by the Corps, reducing the number of alternatives to be carried forward to eleven for review and comment. A summary of the presentation follows.

STATUS OF STUDY

At the first Steering Committe meeting, the work process for accomplishing the wastewater management study was discussed and a tentative schedule established. Since then we have modified the schedule to reflect a delay in compiling our basic data in bringing our major consultants under contract.

Key control dates in our revised schedule are of particular significance. The formulation of the initial conceptual alternatives was completed on 9 June; these were sent to you in Progress Report Number 2, along with some backup data. Based on input received from the Advisory Committees and the results of this Steering Committee meeting, we plan to complete our initial screening today (26 June) reducing the alternatives to be carried forward to the most promising (about ten in number.) The remaining alternatives will be evaluated during the next three months. After another series of committee meetings, a second screening will be completed by 22 September to reduce the alternatives to four or five. These will be carried forward for further detailed design and analysis. We plan to publish the draft report on 18 December and incorporate comments and modifications in the final report on 28 March 1973, about a month later than originally planned.

Since the first Steering Committee meeting, Citizens Advisory Committees have been formed for groups primarily concerned with Conservation and the Environment, Commerce & Industry, and the Local Planning Organizations and Sanitary District. Each committee is already contributing to the study. For example, the Conservation group has obtained and developed data for use in identifying conservation and recreational needs of the area. The Commerce & Industry group is defining industrial water reuse capabilities, and the Local Sanitary District group is providing financial data. Each

of the committees has been afforded the opportunity to send observers to the other committee meetings.

Plan Formulation

The status of our progress is presented in the three elements of our plan formulation: the institutional studies, the socio-environmental studies, and the technical studies.

Institutional Studies

In the institutional area, contracts with two groups of academicians to review existing institutions have been completed. Their data will be used as input to a continuing study by the firm of Linton, Mields & Coston (LM&C). The first phase of the LM&C study entails development of a Reference Plan describing a cross-section of the existing institutions participating in wastewater management and water resource development. This plan will describe present water usage and the functions of these institutions in areas such as planning, management, construction, and operation of wastewater systems. It will identify the financial, manpower, and organizational capabilities of these institutions. This plan will be ready for review on or about 31 July 1972.

The second phase of the LM&C study parallels the evaluation of the intermediate technical plans that emerge from the first screening. Major tasks include (1) Evaluation of the technical plans to identify broad institutional requirements; (2) Development of a comparison base by modifying existing institutions to satisfy the broad institutional requirements identified previously; (3) Identification and comparison of new institutional alternatives and (4) Use of this background in screening the technical plans.

The third phase of the LM&C study takes place during the refinement of the four or five final alternatives that emerge from the second screening. This phase includes the refinement of the comparison base developed in the second phase to adapt it for use with any of the technical alternatives, and the development of separate, optional institutional alternatives for each of the technical plans. The presentation of institutional plans for each alternative will include recommendations for new statutory and institutional authorities as required, and recommended public finance and implementation plans.

Socio-environmental Studies

There are two major study efforts for the socio-environmental studies. The first is the development of a plan for the environmental, conservation, and water related recreational needs of the study area. Towards this effort

the Conservation and Environmental Advisory Committee has been assisting us in obtaining ideas and data related to these needs through a questionnaire. We have received approximately seventy responses to this questionnaire and are now compiling the information received. Simultaneously, we have been surveying the requirements of Forest Preserves and Parks, either through meetings or by correspondence with their boards.

Information received from the questionnaires, the Forest Preserve and Park boards, and from appropriate Federal, State and local governmental agencies will be used first in developing a prototype model for meeting the conservation and recreational needs in a corridor extending along the North Branch of the Chicago River. This prototype study will be completed by the middle of July. We will then expand the study to cover all major C-SELM stream and park requirements.

Our second major socio-environmental effort concerns the development of an evaluation model that will be used in the screening process. The model consists of a series of input-output matrices. A tentative model has been completed by a group of local academicians representing a complete spectrum of social and environmental disciplines. This model is currently being tested and will be refined to eliminate deficiencies revealed in the tests. The evaluation model will be ready for review in August. It will be used in the second screening process in September and subsequently in a detailed evaluation of the final alternatives that emerge from this screening.

Technical Studies

The first phase of the technical studies, now completed, is tied closely with the logic pattern of our plan formulation process. The plan formulation process evolved from the study objective of developing alternative wastewater management plans to achieve either current water quality standards or the "No Discharge of Critical Pollutants" (NDCP) standard. The plans will be compared to identify the social, economic, and environmental implications associated with each plan.

In developing plans for the "No Discharge of Critical Pollutants" standard, each of three water reclamation technologies will be evaluated. These include advanced biological and advanced physical-chemical (P-C) treatment plant technologies, and land treatment.

Attachment I-1 shows schematic diagrams of the internal processes considered in each of the advanced treatment plant alternatives. These component processes were selected during the first phase of the study as the best combination of processes capable of achieving the NDCP standard.

In the advanced biological process, polluted water is collected and transported to plants where it is processed through degritting, primary

settling, aeration, secondary settling, nitrification and denitrification, chlorination, post aeration, and monitoring prior to its return to the water resource. Sludge separated in these processes is treated and moved to disposal sites.

In the advanced physical-chemical process, polluted water is collected and transported to plants where it is processed through lime clarification, carbon absorption, clinoptilolite ammonia removal, filtration, chlorination, post aeration and monitoring prior to its return to the water resource. Sludge separated in these processes is treated and moved to disposal sites.

Attachment I-2 shows schematic diagrams of a conventional biological plant system and an advanced land treatment system. In the advanced land treatment, wastewater is collected and transported to a conventional plant where it is processed through degritting, primary settling, aeration and secondary settling. However, rather than being chlorinated and discharged at this stage, it is disinfected, stored, and then used in spray irrigation. The soil filter then removes additional impurities prior to final monitoring and return to the water resource. As in the treatment plant systems, sludge produced in this system is processed through treatment and disposal.

Attachment I-3 summarizes the effluent quality expected to be achieved by each of the advanced treatment systems (biological, physical-chemical and land). The major pollutant constituents considered are COD (chemical-oxygen demand), BOD (biochemical oxygen demand), suspended solids, soluble phosphorus, nitrogen in various forms, heat, oils and greases, phenols, pathogens and viruses, trace metals, boron, arsenic, and cyanide. Performance data for the advanced biological system is based primarily on data from existing, small-scale systems. Data for the advanced physical-chemical and land systems is derived from limited small scale operations, pilot plants, engineering studies, and laboratory studies. Thus a degree of uncertainty exists with all of this data, which is normal when one approaches the "state of the art." However, we believe that it represents the best data currently available. Additional data received as the study progresses will of course be incorporated. Results received from all three systems are roughly equal and represent the best that can be achieved with current technology.

As part of the plan formulation process, our planning framework is structured to meet the national goals set by Congress: enhancement of the environment, improved social well-being, and development of both the national and regional economies.

These goals have been translated by a regional Upper Mississippi River Basin study into eight major land and water related needs for the study area. These include water quality improvement, flood control, general re-creation, fish and wildlife conservation, municipal and industrial water supply, the preservation and enhancement of the environment, commercial

navigation, and social well-being. From this framework, we derive two primary technical design goals: first, to design the wastewater treatment systems to meet required effluent standards; and second, to meet concurrently the area's land and water needs in an optimum manner.

Since our wastewater systems must capture and treat that portion of the storm runoff containing critical pollutant loads, properly designed systems will make a major contribution to meeting the first two needs, those of water quality improvement and flood control. The remaining needs can be supported through effective use of the reclaimed water and by a balanced land and water resource development program.

The last step in this initial phase of the plan formulation process is to structure an initial set of broad conceptual alternatives to meet the needs of the year 2020. These alternatives are designed to facilitate the decision making process that will take place in reducing the number of alternatives which will be returned for further study. Some of the major variables considered in structuring the alternatives include water quality standards, the functional components of the systems needed to collect and treat the wastewater and to dispose of its residual products, regionalization, water reuse to satisfy needs, and resource philosophies related to greenbelt systems.

Attachment I-4 outlines the 19 initial alternatives developed. These alternatives are differentiated by: effluent quality - either meeting existing standards or the "No Discharge of Critical Pollutants" standards, the treatment system - advanced biological, advanced physical-chemical or a land system; the degree of regionalization - employing an efficient minimum number of treatment sites, an intermediate, or a larger number of sites; the type of collection systems - combined or separate; the reuse of water; and other factors.

Alternatives 1 and 2 achieve the existing water quality standards using biological processes. Alternative 1 is a compilation of the existing plans. Alternative 2 is designed to show by comparison the implications inherent in an efficient use of a reduced number of plants and of considering water reuse. Both alternatives employ a mixture of combined and separate collection systems. The remaining alternatives are all designed to achieve the "No Discharge of Critical Pollutants" standards. Alternative 3 employs the advanced biological treatment system, alternatives 4 and 5 are designed with both a complete advanced biological system and alternatively a complete physical-chemical system. A comparison of these systems will indicate the most cost-effective advanced treatment plant system.

Alternatives 3 through 5 are designed with a large, intermediate and minimum number of plants, respectively, to allow comparison of the economies of scale. All three systems employ combined sewers and have a water reuse add-on. Alternatives 4 and 5 are also designed to serve as a base for a variety of incremental add-on sludge management systems for advanced waste

treatment sludge optimization of usage. A comparison of these variations will demonstrate cost differences associated with alternative sludge management systems.

Alternative management techniques for biological sludges include drying for fertilizer production, wet oxidation for disposal, and fermentation for the manufacture of animal feeds. Sludge generated as a by-product of physical-chemical treatment is chemically inert and sterile and while it has no nutrient or humus value, can be advantageously used agriculturally for soil pH control and as a soil conditioner. Physical-chemical treatment plant technology involves sludge incineration as an integral step.

Treatment plants utilizing advanced biological treatment processes are expected to produce 1.0 ton of anaerobically digested sludge per million gallons of inflow, while physical-chemical type treatment plants should produce sludge at the rate of 0.5 ton per million gallons of raw sewage treated. Land treatment is expected to produce 0.8 ton of anaerobically stabilized sludge per million gallons of inflow, as are existing conventional secondary treatment plants.

The sludges generated in the C-SELM area are considered treated by each of the techniques of agricultural utilization, land reclamation, and incineration. The potential sites suitable for each option are chosen both inside and outside the C-SELM area. Applicable land sites, management methods and treatment plant sludge types are identified in the following table.

Treatment Plant Sludge Management Options

Option No.	Type of Sludge	Sludge Utilization	Sites of Application
1	Adv. Biol.	Agricultural	Fulton County
2	Adv. Biol.	Agricultural	McHenry, Will County and Kankakee Area
3	Adv. Biol.	Land Reclam.	Southern Illinois
4	Adv. Biol.	Incineration	In C-SELM Area
5	Phy-Chem.	Agricultural	Fulton County
6	Phy-Chem.	Agricultural	McHenry, Will County and Kankakee Area
7	Phy-Chem.	Landfill	Indiana Quarry Area

Alternative 6 is similar to alternative 5 except that stormwater flows in newly developed areas are kept separate from municipal and industrial flows. A comparison of these two systems will illustrate the difference in costs involved in these alternative collection system approaches.

Alternatives 7 through 10 are designed to identify the implications involved when the priority consideration in plant siting is maximum water reuse. Two water reuse options are employed in Alternatives 7 and 8 for an intermediate number of plants and in Alternatives 9 and 10 for a minimum number of plants.

The reclaimed water resulting from the "No Discharge of Critical Pollutants" effluent quality goal have been assigned, for the purpose of the initial screening, a priority and amount of reuse in 2020 as follows: (1) Potable Water Supply-546 MGD, (2) Recreational Stream Flow-201 MGD, and (3) Maintenance of Navigation Flows-860 to 3,000 MGD.

The potable water supply deficient areas in the C-SELM area are those predominantly western regions where the shallow aquifer system has been locally overpumped and mined. The deficient areas are identified in the first phase of the study.

The two options of the reuse priority list have been created to distinguish different means for achieving the C-SELM potable water needs. In Option 1, managed rural stormwater is brought by a pipe collection and distribution system to the potable supply deficient areas supplemented by make-up flow piped from Lake Michigan to DuPage County, Illinois. In Option 2, managed rural stormwater is brought by means of surface stream flow mixed with reclaimed urban-suburban wastewater from the rural areas to the potable supply deficient areas, once again supplemented by make-up flow piped from Lake Michigan to DuPage County, Illinois.

A water balance that demonstrates the reuse concepts, and that is consistent with 2020 C-SELM flows for the majority of the specific alternative plans, is schematically shown in Attachment I-5.

The portion of the system devoted to water supply was more extensive in Priority 1 and provided more direct service of needs. In Priority 2, the streams acted as collectors, and the distribution system was oriented to them. The sub-system to supply low flow augmentation for recreational purposes varied between the options due to the different number and placement of treatment plants. The remainder of the system devoted to providing for navigational flows was the same in both cases.

Out of the total 1,800,000 acres in the C-SELM region, about 600,000 acres are classified as rural for a 2020 design condition. It is assumed that the drainage design for this portion of the region will include local land treatment of all the runoff, including that from animal feed lots.

This land treatment approach for rural areas is applicable to each of the alternatives.

The basic approach is to utilize on-stream impoundments, supplemented as necessary by pit excavation and dike impoundments adjacent to the stream, to capture and regulate the storm runoff so that it can be subsequently irrigated on adjacent agricultural lands. A schematic figure of this stormwater management concept is presented in Attachment I-6. Water management sites were assumed to be uniformly distributed in the rural areas; one 1.2 MGD detention pond per 2,000 acres. The reclaimed water quantity will meet a NDCP effluent quality goal.

Alternatives 11 and 12 employ land treatment. They are designed to show the implications of employing one consolidated site in alternative 12 versus three sites in alternative 11. A comparison of these two alternatives with the corresponding most cost-effective advanced plant systems developed in alternatives 4 and 5 provides a measure of the cost differences between plant and land systems. The same level of water reuse is common to all four and thus will underscore the add-on implications.

Alternative 13 differs from alternative 11 in that it substitutes two of the most cost-effective plants for the two most remote land treatment sites. This alternative is designed to show the efficiency of combined land and treatment plants systems.

Alternatives 14 and 15 are designed to show the cost implications of designing a collection system consistent with the "finger" plan of development included in the Northeastern Illinois Planning Commission plan, rather than running lines across greenbelt areas. These two alternatives are otherwise the same as alternatives 5 and 11.

Alternatives 16 and 17 are directly comparable with land system alternatives 11 and 12 except that they incorporate integrated add on systems for pumped storage and waste heat dissipation from power plants. This will explore potential maximazation of reuse benefits by incremental add-ons to the alternatives.

Alternatives 18 and 19 include the concept of scheduled night spray irrigation of the greenbelt park areas at reduced application rates. In alternative 18 the remaining wastewater is processed at one of the land treatment sites while in alternative 19 this remaining wastewater is processed in agricultural areas near the extremities of the greenbelt fingers.

A comparison of these last two alternatives with each other and with alternative 15 shows the cost implications involved.

(For a more detailed analysis of the initial nineteen alternatives, see "Progress Report No. 2").

COST COMPARISONS

Existing Standards Alternatives

Alternative 1 has a total annual cost of $385 million. With the increased economy of scale achieved with the screening base, this cost was reduced to $362 million in alternative 2. This is an indication of the costs savings obtained through greater use of regionalization. The water reuse option increases this cost about $5 million. (These alternatives lack the level of stormwater collection included in the NDCP alternatives.) (See table below)

No.	Alternative Description	Total Costs ($ Million/Year)
1	Existing Plans Without Reuse	385.5
2	Screening Base Without Reuse	362.1
2	Screening Base With Reuse	367.1

Advanced Treatment Plant Alternatives

For the first three advanced waste treatment alternatives, it is interesting to note a decrease of cost with an increased use of dispersion. The lower costs in alternative 3 result largely from a reduction in the amortized capital costs attributable to the system when maximum use is made of existing facilties.

In alternatives 4 and 5, advanced P-C systems are somewhat less costly when using the same number of treatment plants. The trend in dispersion for the P-C system also indicates that 8 plants may be too great an employment of regionalization. (See table below)

Alternative No.	Number of Plant	Total Cost ($ Million/Year) Adv. Bio.	Adv. P-C
3	64(or more)	1,149.5	-
4	17	1,217.9	1,107.9
5	8	1,227.5	1,112.6

Sludge Management Options

The multiple site agricultural option is the least costly of four sludge management options combined with alternative 4's advanced biological system. When advanced P-C is considered, land reclamation appears to be most promising from a cost basis. For alternative 5 with eight plants, the single site agricultural option is the least costly, although the cost difference

between single and multiple sites is not appreciable. For advanced P-C and alternative 5, land reclamation is again least costly. (See table below)

Alt. No.	No. of Plants	Sludge Mgt. Options	Sludge Mgt. Cost ($ Million/Year) Adv. Bio.	Adv. P-C
4	17	Agric.-Single Site	13.0	23.7
4	17	Agric.-Mult. Site	9.9	26.5
4	17	Land Reclamation	40.0	7.2
4	17	Incineration	38.3	-
5	8	Agric.-Single Site	27.7	23.5
5	8	Agric.-Mult. Site	30.6	26.1
5	8	Land Reclamation	39.4	16.9
5	8	Incineration	38.3	-

Combined Versus Partially Separate Systems

Alternative 6, using a combined and separate collection system as shown in the table below, is about $32 million more expensive than alternative 5 which is all combined. The additional costs result mostly from the increased number of treatment plants in alternative 6. The combined system appears to be more economical. (See table below)

	Alternative 5	Alternative 6	Cost Difference
Collection System	Combined	Comb. & Sep.	
Number of Plants			
-Combined	8	4	
-Stormwater		4	
-Wastewater		6	
--Total	8	14	
Cost ($ Million/Year)			
-Collection/Storage	379.6	381.2	1.6
-Treatment	714.0	744.3	30.3
-Reuse	19.0	19.0	0.0
--Total	1,112.6	1,144.5	31.9

Water Reuse Treatment Plant Alternatives

In the 17 plant systems of alternatives 4, 7 and 8, alternative 4 was sited without any consideration of water reuse; water reuse was then added on as an option. Facilities in alternatives 7 and 8 were sited considering water reuse and then options 1 and 2, respectively, were incorporated. In option 1 water is piped from rural areas to the need areas, while in option 2 the water is transported from the rural areas in streams. There is not a noticeable

cost difference if plants are sited with or without reuse considerations, and the two plans are essentially identical. Using streams instead of pipes results in a cost savings of about $5 million/year. The results for the eight treatment plant systems of alternatives 5, 9 and 10 are similar, with savings of about $6 million/year by using streams as the transportation network. (See table below)

	Alt. No.	No. of Plants	Cost ($ Million/Year) Reuse	Total
Normal Plant Siting	4	17	18.8	1,107.9
Option No. 1	7	17	18.8	1,107.9
Option No. 2	8	17	13.6	1,102.7
Normal Plant Siting	5	8	19.0	1,112.6
Option No. 1	9	8	19.0	1,112.6
Option No. 2	10	8	12.9	1,106.5

Technology Cost Comparison

In comparing the land treatment alternatives, there is a small increase in costs for alternative 11 using more sites, as compared to alternative 12. Alternatives 18 and 19 employ greenbelts with limited spray application, with the surplus secondary effluent sent to one site for alternative 18 and to the greenbelt extensions for alternative 19. The costs for these alternatives have increased when compared to alternatives 11 and 12 due to the larger amount of land required for limited application in the park areas. These are, however, multipurpose systems serving recreational and environmental functions which may make the additional costs worthwhile.

Alternative 13 is similar to 11 except that two of the land sites are replaced by two advanced P-C systems. The difference in costs between these alternatives is quite small, resulting in alternative 13 from an increase in costs by using a mixed land-treatment plant system, and a decrease in conveyance costs. The slight net increase indicates there is an optimum combination of treatment plant and land facilities.

It seems that the least cost advanced P-C system (alternative 4) and the least cost advanced biological system (alternative 3), are more expensive than some of the various land alternatives in meeting the needs. Costing each of the systems without the provision for stormwater treatment illustrated that a large amount of the costs is attributable to stromwater treatment. A comparison of these costs to the costs to meet the present standards in alternatives 1 and 2 indicates that the costs for NDCP are comparable in many cases to alternatives 1 and 2, although somewhat more costly. (See table below)

Treatment Technology	Alternative No.	Alternative Description	Total Costs With Stormwater ($ Million/Year)	Total Costs W/O Stormwater ($ Million/Year)
Land	12	1 Site	799.1	466.9
Land	11	3 Site	802.3	457.5
Land	18	Parks & 1 Site*	981.0	673.6
Land	19	Parks & Extensions*	1,001.1	671.4
Mixture	13	1 Site & 2 P-C Plants	804.3	479.2
Adv. P-C	4	17 Plants	1,107.9	729.6
Adv. Bio.	3	64 Plants	1,149.5	815.4
Bio.	2	Screening Base	-	367.1
Bio.	1	Existing Plans	-	385.5

*Multipurpose Systems

Synergistic Land Systems

Alternatives 16 and 17 incorporate an add-on for power generation facilities in coordination with the waste treatment facilities. A comparison of alternatives 11 with 16 and 12 with 17 indicates a potential saving in excess of $200 million/year due to the synergistic effect of the power supply add-on. (See table below)

Alt. No.	No. of Sites	Power Add-on	Cost ($ Million/Year) Total	Diff.
11	3	None	785.3	-
16	3	Yes	577.1	208.
12	1	None	782.1	-
17	1	Yes	574.2	207.9

SUGGESTED ALTERNATIVES

Our thoughts on which alternatives we felt could best emerge from the first screening were conceptualized while preparing for this reduction of alternatives. We propose eleven alternatives to be carried forward; the final determination will not be made until we have had the opportunity to receive comments and suggestions from the committee. In each of the suggested alternatives, the systems will be costed and designed for the portion of the system which should be operational by the year 1990, within the framework of the year 2020.

Existing Standards

The first two suggested alternatives are for the existing standards and

are identified as A and B. (See attachment I-7). Alternative A is similar to alternative 1 of the initial 19, except that the design year is 1990. Alternative B, the screening base, considers optimization of the gains which could be achieved by employing regionalization and water reuse. To insure that the screening base reflects a true optimization, it will be reevaluated during the process of design for the year 1990.

AWT (Bio. and P-C) Plant Technologies

The remaining alternatives will each be designed for the NDCP goal. The first four, alternatives C to F, have advanced waste treatment plants similar to initial alternatives 3 to 5. As before, each alternative will have a pure advanced biological and a pure advanced P-C system. These alternatives are designed to indicate the merits of different degrees of regionalization, and the economic tradeoff points (or balance) between numbers and size of treatment plants, and the requirements for stormwater collection, treatment, and disposal. The alternatives are C (maximum dispersion 64 plant system as in alternative 3); D (intermediate dispersion, range 1, about 40 plants); E (intermediate dispersion, range 2, 17 plants as in alternative 4); and F (minimum dispersion, 8 plants as in alternative 5).

Alternative G, a combination of advanced waste treatment plant technologies, will be developed after alternatives C to F have been formulated. By comparing these alternatives to develop an optimum mix of biological and P-C advanced waste treatment systems, alternative G will be derived as the combination that utilizes the best features available for each technology at specific locations.

AWT, Land System

Alternatives H and I are land systems. The first is a single site land application system similar to alternative 12. This alternative is maintained since it was the least costly of this year 2020 advanced waste treatment alternatives. It will serve as a base for comparison of other alternatives as the study progresses.

The second alternative (see attachment I-8) utilizes disperse sites for treatment, reflecting the various problems inherent when just one large treatment site is used; for example, institutional problems or conflicts of local desires may evolve with a single site. The dispersed sites under consideration are shown as the shaded areas lying in a band around the study area. The system may be preferable to the single site system when economic or other aspects are considered.

Variations in System Designs

The last two suggested alternatives, J and K, are designed to indicate possible achievements through other variations in system design. Alternative J

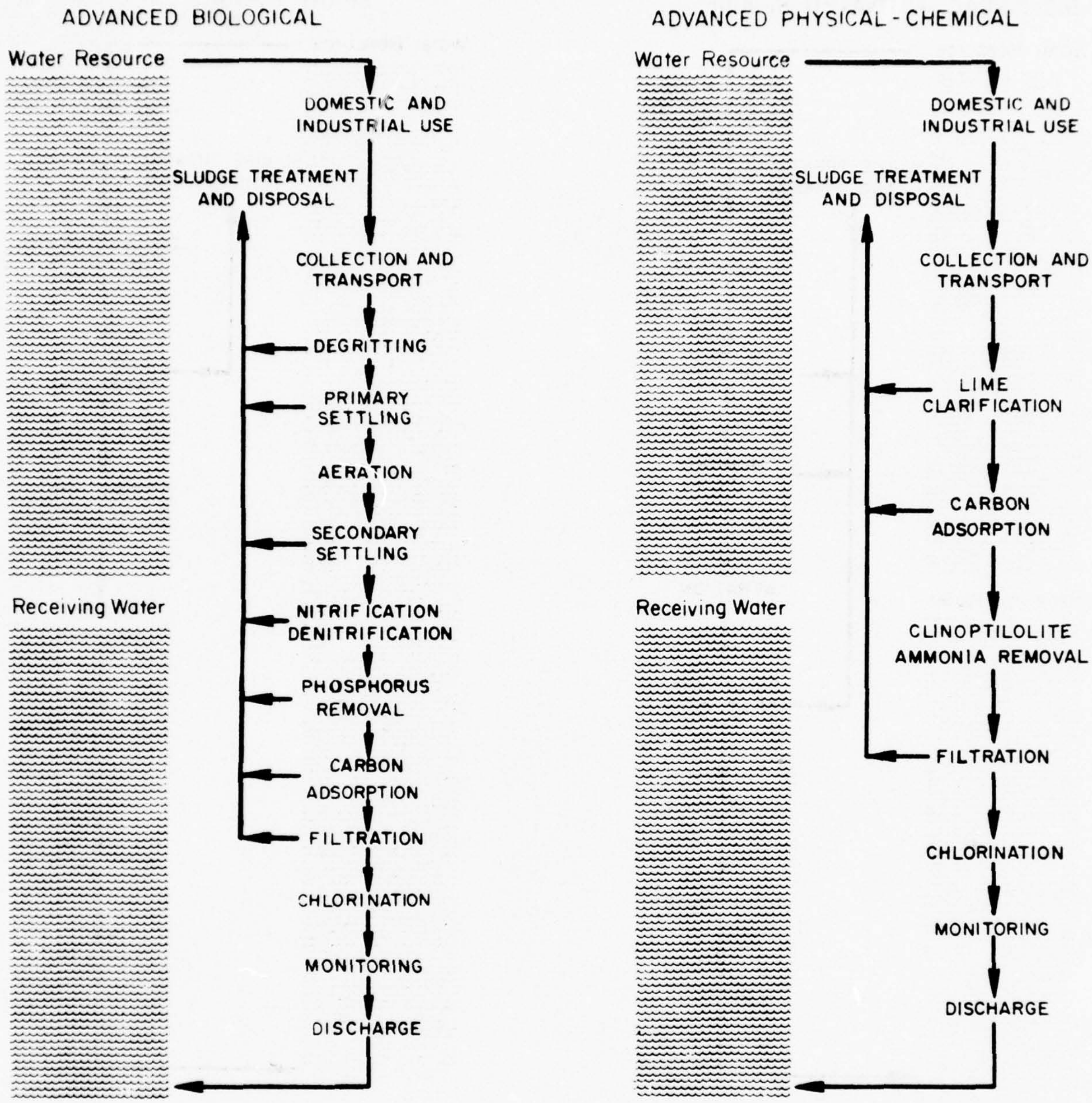
(see attachment I-9) is a combination of treatment plants and land treatment systems. The shaded area shown will be served by five advanced waste treatment plants. These include three Metropolitan Sanitary District plants (North, West-Southwest, and Calumet), the Hammond plant, and the Gary plant. The outlying, cross-hatched area will be serviced by dispersed land sites. The area shown in white will be served either by treatment plants or land systems. A choice will be made after more extensive evaluation in this area.

The last alternative considers the open space and recreational requirements identified by the various regional planning agencies (see attachment I-10). It is similar to initial alternative 19 that considered limited spray application at night in greenbelt areas and use of outlying farms areas. Alternative K provides the maximum flexibility for a later increased use of greenbelt areas and for future development to meet requirements for the year 2020.

Add-ons and Design Considerations

These eleven suggested alternatives will each include the various add-ons and design considerations identified previously for the initial 19 alternatives (sludge management alternatives, reuse add-ons, etc.) Significant emphasis will be given to the reuse of water due to the large quantity of water considered for the NDCP alternatives. Similarly, attention will be given to the requirements of various water users, such as diversion.

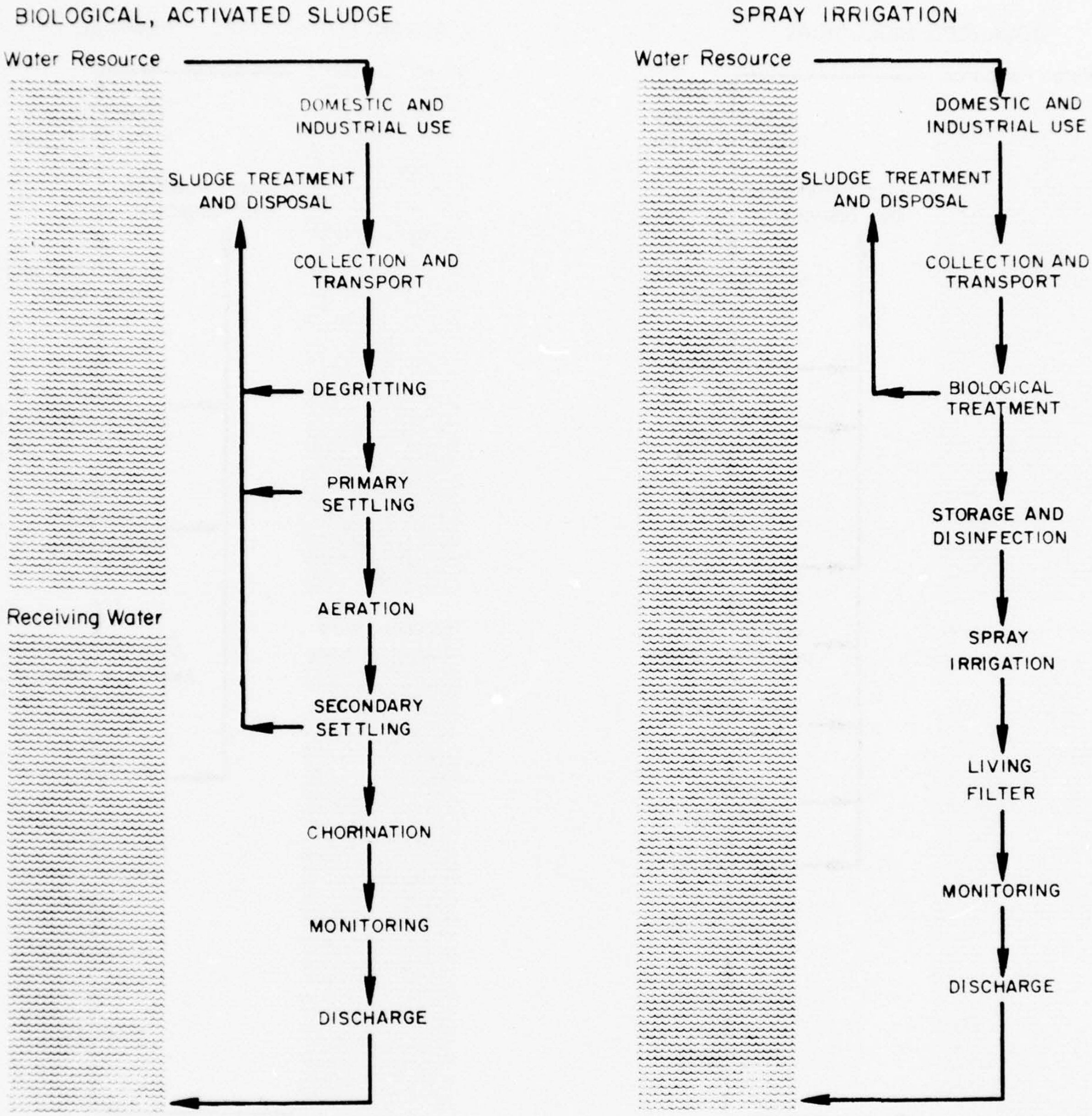
Other considerations include the following: (1) We have initiated studies for the ways to minimize costs associated with stormwater collection and storage. It appears that disperse storage sites with the corresponding smaller conveyance system requirements may be one method of cost minimization. (2) Much more analysis will be done for the rural stormwater management system to adapt it to the year 1990 system. (3) Consideration will continue for the institutional implications and the social and environmental impacts of alternatives. (4) The philosophy of the multiple use of open space requires considerable more analysis, particularly since many alternatives have multiple benefits. (5) Finally, and very important, is the consideration for system flexibility and reliability. Alternatives with more disperse facilities and more lines for transport may provide better reliability then less dispersed systems. However, this and other considerations of reliability cannot be ascertained without additional study and analysis.



SCHEMATIC DIAGRAMS
OF TREATMENT PROCESSES

Conventional Treatment, Treatment Plant Alternative

Advanced Waste Treatment, Land Treatment Alternative



SCHEMATIC DIAGRAMS OF TREATMENT PROCESSES

Attachment I-2

ALTERNATIVE PROCESS SYSTEM PERFORMANCE DATA

	Effluent Quality							
Treatment Type	COD mg/l	BOD_5 mg/l	Suspended Solids mg/l	Dissolved Solids mg/l	Soluble Phosphorus mg/l	NH_3-N mg/l	NO_3-N NO_2-N mg/l	Organic N mg/l
Advanced Biological	10	3	1	350	0.1-0.2	0.3	2-5	0
Chemical-Physical	10	3	1	350	0.1-0.2	0.5	2	0
Land Treatment	6	2	0	400	0.01	0	2	0

	Effluent Quality							
Treatment Type	Heat, Temp. °F	Oils Greases mg/l	Phenols mg/l	Pathogens, Viruses	Trace Metals*	Boron mg/l	Arsenic mg/l	Cyanide mg/l
Advanced Biological	53-78	1	0.01	Present**	0.1	1.0	0.03	0
Chemical-Physical	53-78	1	0.01	Present**	0.1	1.0	0.03	0
Land Treatment	55-70	0	0	0	0	0	0	0

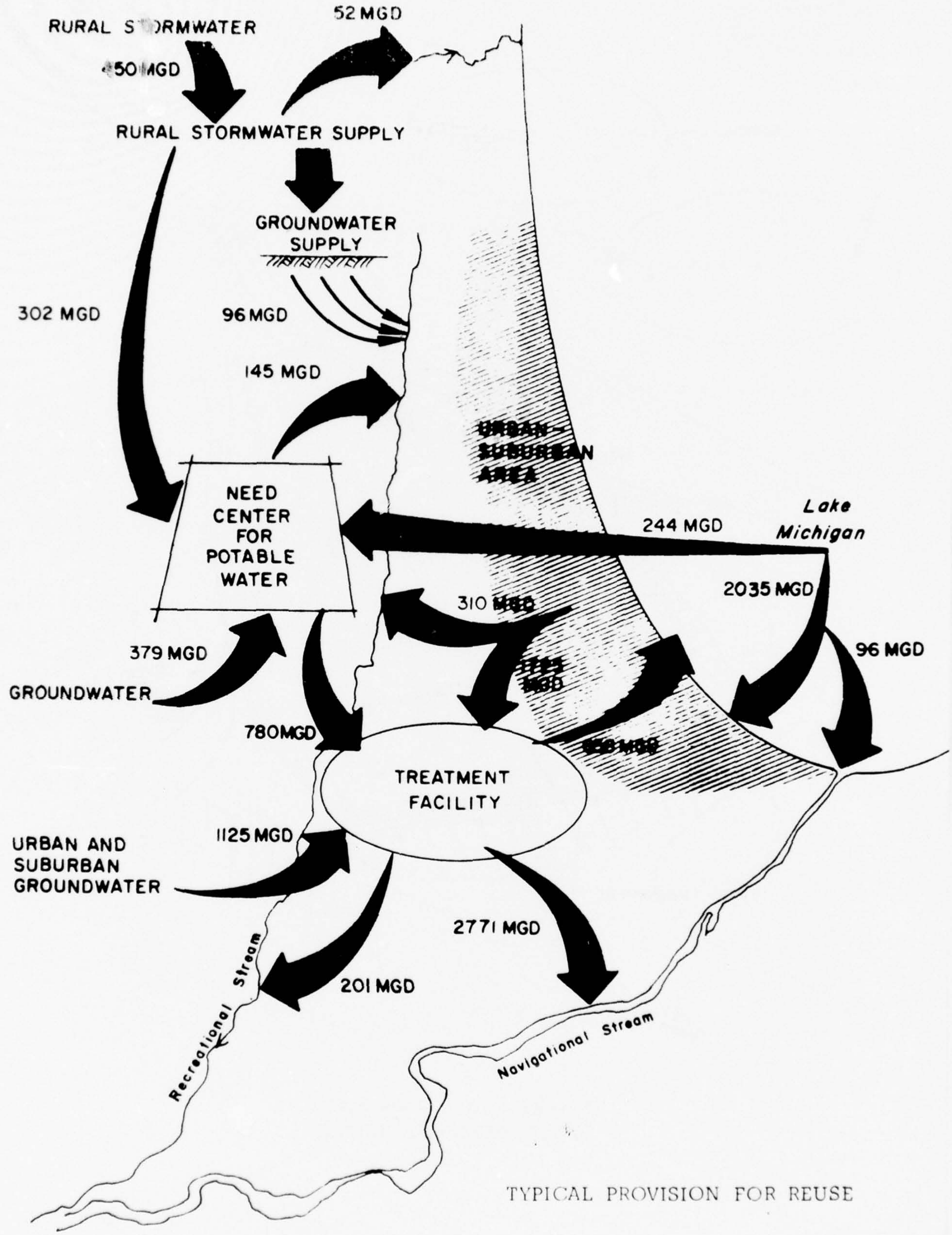
*Trace Metals: Aluminum, Cadmium, Chromium, Copper, Lead, Nickel, Zinc, Iron, Manganese, Mercury

**Present with Current Disinfection Practice.

INITIAL WASTEWATER MANAGEMENT ALTERNATIVES

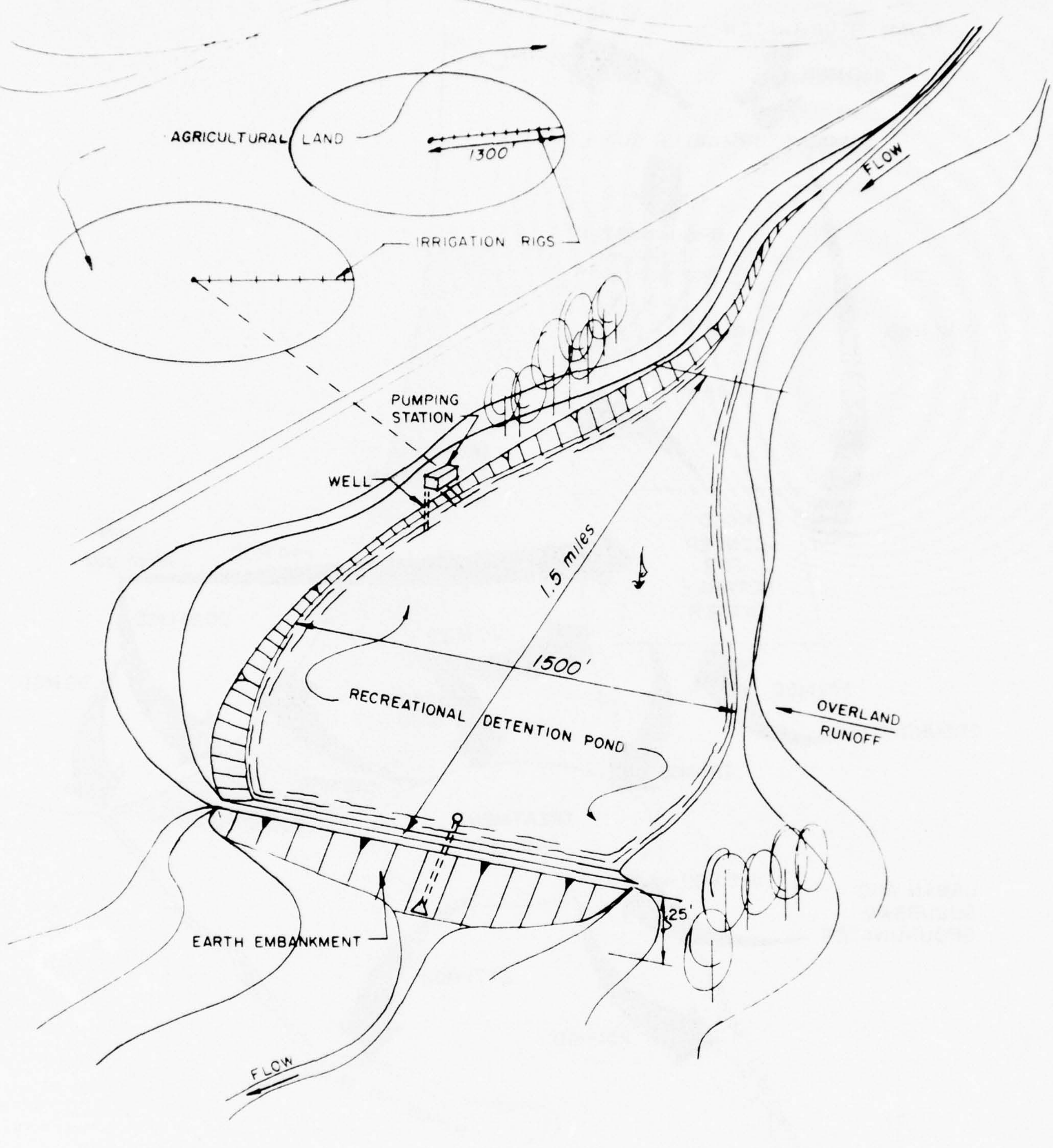
ALT. NO.	EFFLUENT QUALITY: EXIST	EFFLUENT QUALITY: NDCP	TREATMENT: ADV BIO	TREATMENT: ADV P-C	TREATMENT: LAND	REGIONALIZATION (NO. OF PLANTS): MIN	REGIONALIZATION (NO. OF PLANTS): INT	REGIONALIZATION (NO. OF PLANTS): MAX	COLLECTION SYSTEM: COMB	COLLECTION SYSTEM: SEP	REUSE OF WATER	REMARKS
1	X		X					X	X & X		CURR.	EXIST. PLANS
2	X		X			X			X & X		MAX.	SCREENING BASE
3		X	X					X	X		ADD-ON	
4		X	X & X				X		X		ADD-ON	SLUDGE MANAG. ALTS.
5		X	X & X			X			X		ADD-ON	SLUDGE MANAG. ALTS.
6		X	X OR X			X			X & X		ADD-ON	
7		X	X OR X				X		X		OPT. 1	
8		X	X OR X				X		X		OPT. 2	
9		X	X OR X			X			X		OPT. 1	
10		X	X OR X			X			X		OPT. 2	
11		X			X		X		X		ADD-ON	3 LAND SITES
12		X			X	X			X		ADD-ON	1 LAND SITE
13		X	X OR X	&	X		X		X		ADD-ON	1 LAND SITE, 2 PLANTS
14		X	X OR X			X			X		ADD-ON	NIPC FINGER PLAN
15		X			X		X		X		ADD-ON	NIPC FINGER PLAN
16		X			X		X		X		ADD-ON	INTEGRATED POWER FAC.
17		X			X	X			X		ADD-ON	INTEGRATED POWER FAC.
18		X			X		X		X		ADD-ON	1 LAND SITE + FINGERS
19		X			X		X		X		ADD-ON	FINGERS + EXTENSION

ATTACHMENT 1-4



TYPICAL PROVISION FOR REUSE

Attachment I-5



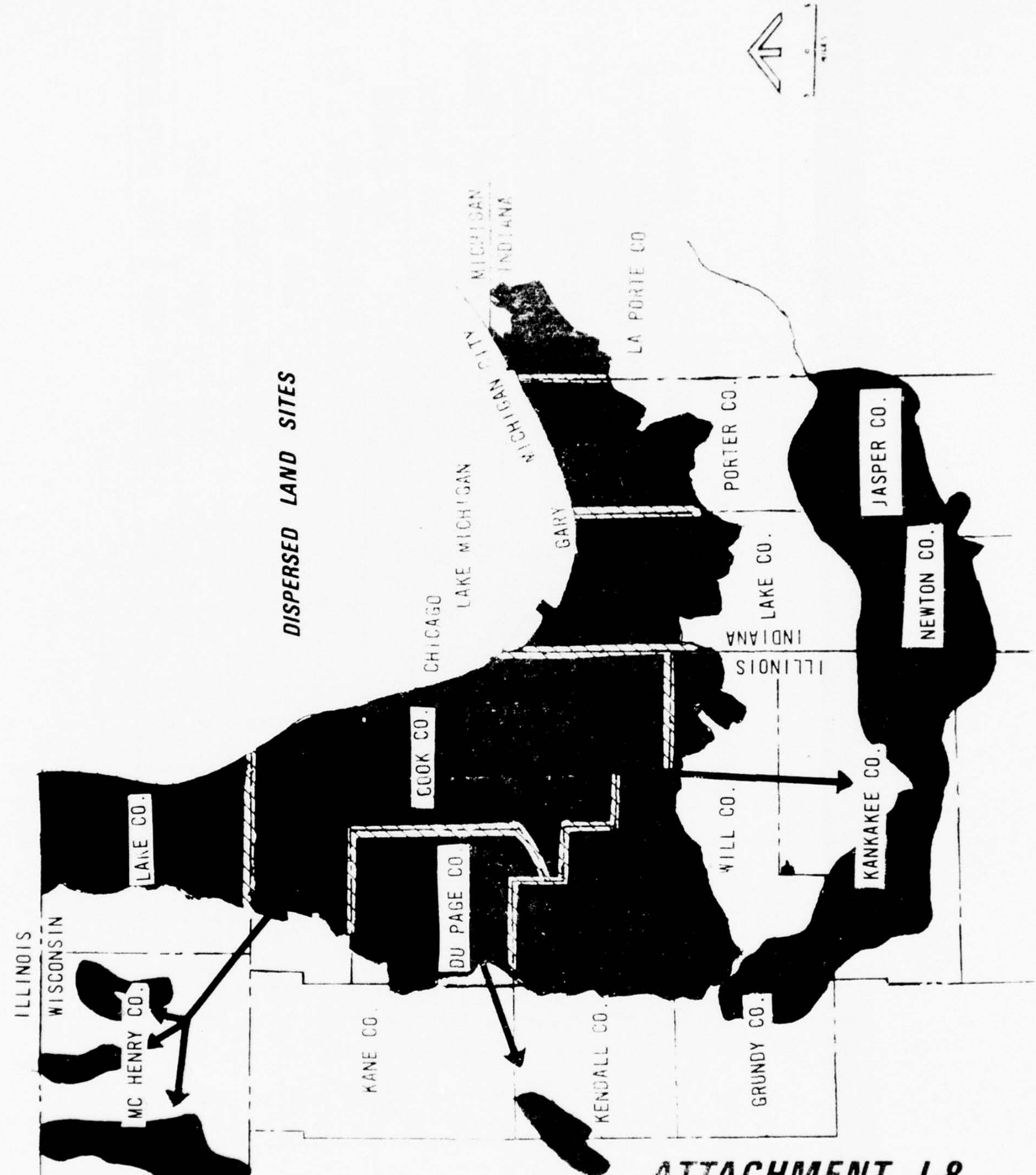
TYPICAL RURAL STORMWATER
MANAGEMENT FACILITIES

Attachment I-6

INTERMEDIATE WASTEWATER MANAGEMENT ALTERNATIVES

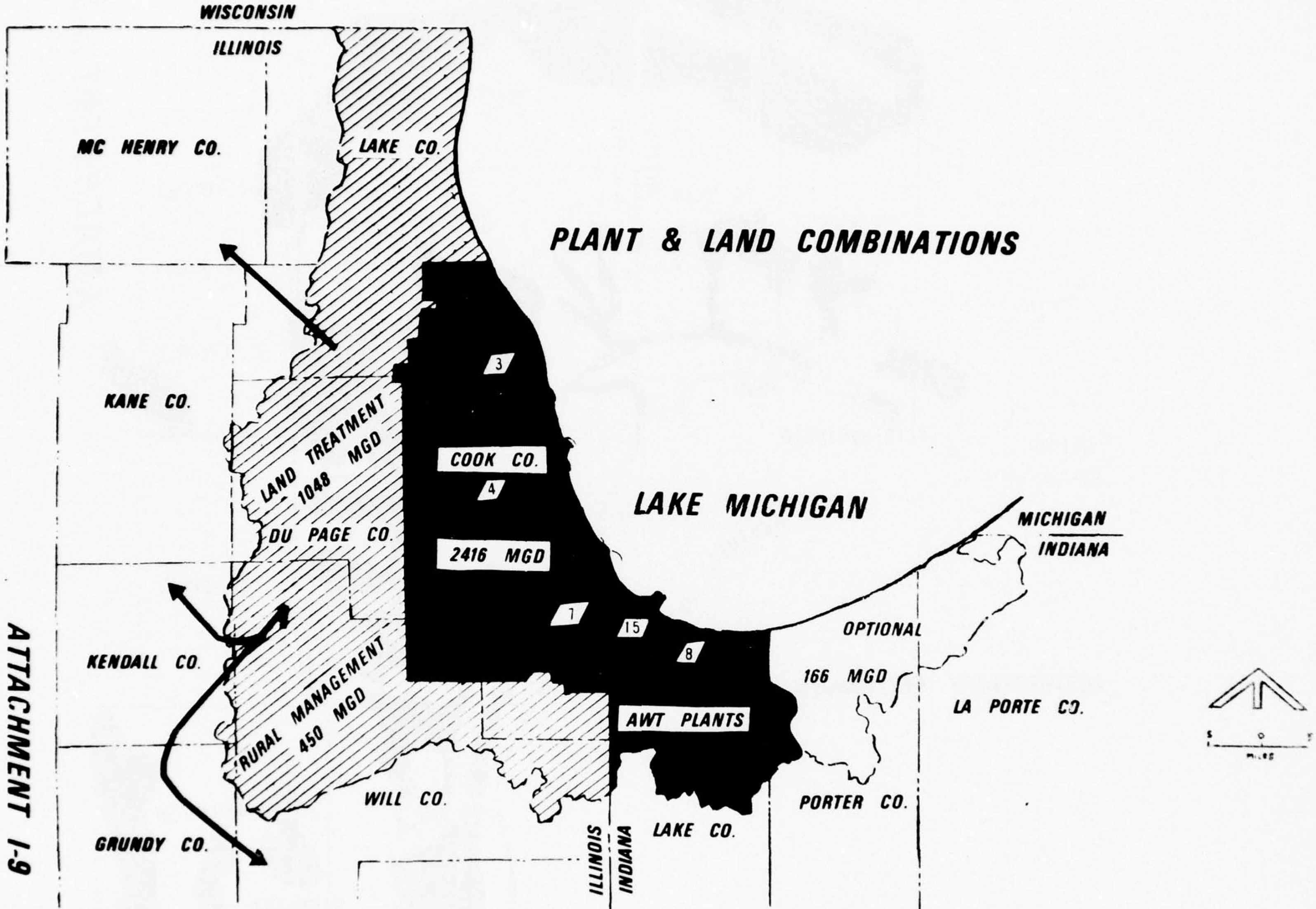
ALT.	EFFLUENT QUALITY		TREATMENT			DEGREE OF REGIONALIZATION			COLLECTION SYSTEM		REUSE OF WATER	REMARKS
	EXIST	NDCP	ADV BIO	ADV P-C	LAND	MAX	INT	MIN	COMB	SEP		
A	X		X					X	X &	X	CURR.	EXIST. PLANS
B	X		X			X			X &	X	MAX.	SCREENING BASE
C		X	X OR	X				X	X		ADD-ON	(64 PLANTS)
D		X	X OR	X			X		X		ADD-ON	RANGE 1 (~40 PLANTS)
E		X	X OR	X			X		X		ADD-ON	RANGE 2 (17 PLANTS)
F		X	X OR	X		X			X		ADD-ON	(8 PLANTS)
G		X	X &	X			X		X		ADD-ON	COMBINATION P-C & ADV. BIO
H		X			X	X			X		ADD-ON	1 LAND SITE
I		X			X		X		X		ADD-ON	LAND SITES
J		X	X OR	X &	X		X		X		ADD-ON	PLANT AND LAND
K		X			X		X		X		ADD-ON	NIPC & REC. DEVELOPMENTS

ATTACHMENT I-7



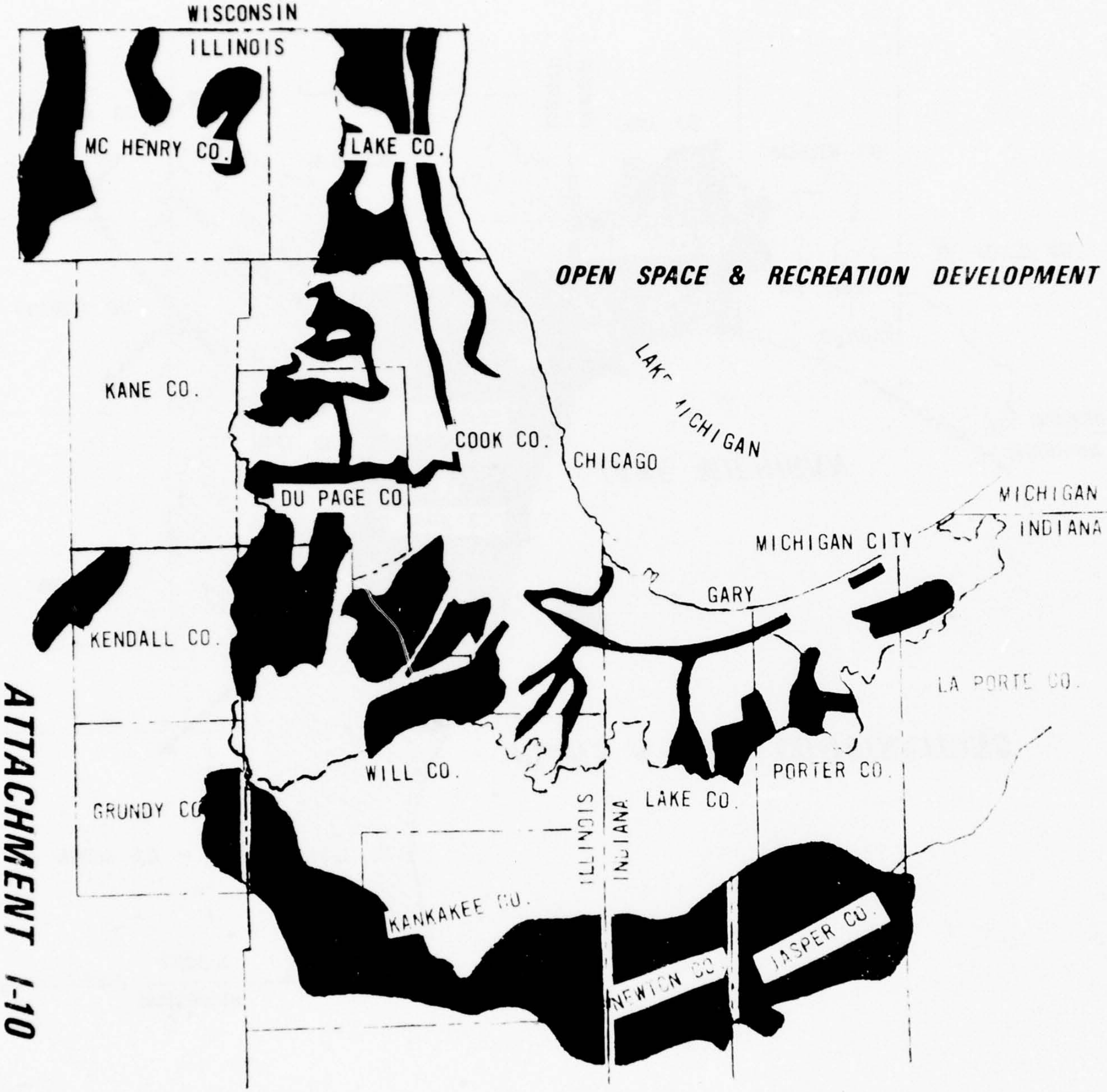
ATTACHMENT I-8

PLANT & LAND COMBINATIONS



ATTACHMENT I-9

OPEN SPACE & RECREATION DEVELOPMENT



ATTACHMENT I-10

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

STAGE II - SECTION II

SECOND STEERING COMMITTEE MEETING

SUMMARY

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

26 June 1972

PREFACE

On 26 June 1972, the U. S. Army Corps of Engineers, Chicago District, conducted the second in a series of Steering Committee meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The meeting was held in the Everett M. Dirksen Room (1220), 219 S. Dearborn St., Chicago, Illinois.

The meeting was scheduled at a critical point in the study, the "screening" of the initial array of nineteen alternatives previously sent to Steering Committee members in Progress Report Number 2.

Progress Report Number 2 presented the plan-formulation rationale used in the selection of the initial array of alternatives, as well as a descriptive analysis of each of the nineteen alternatives, the "add on" options, and the costs associated with each. The purpose of the Second Steering Committee meeting was to discuss the findings and solicit comments and recommendations as to which alternatives warrant further study.

A summary of the meeting is presented herein. A list of participants at the meetings and a condensation of the discussion during the question and answer period following the presentation is presented herein.

STAGE II - SECTION II

CHICAGO-SOUTH END LAKE MICHIGAN
WASTEWATER MANAGEMENT STUDY
STEERING COMMITTEE MEETING

Organization and Representative Invited	Representative Attended
Mr. Albin Pagorski Sanitary District of Bloom Township	Mr. J. E. Meers
Mr. Jim Webb Water Division State of Illinois, Department of Business and Economic Development	Mr. Jim Webb
Mr. Jack W. Cormack North Shore Sanitary District	Mr. Jack W. Cormack Mr. H. William Byers
Mr. Norman E. Tufford Lake Porter County Regional Transportation and Planning Commission	Mr. Kenneth Cypra
Mr. David Winsmore Comey Businessmen for the Public Interest	Mr. David Winsmore Comey
Mrs. Louise Rome Illinois League of Women Voters	Mrs. Louise Rome
Mr. Oral H. Hert Indiana State Board of Health	Mr. Oral H. Hert
Mr. James O. Russell Division of Water, Indiana Department of Natural Resources	Mr. James O. Russell
Col. John Corey (Ret.) Chicago Department of Water and Sewers	Mr. John B. W. Corey
Mr. Perry Miller Indiana Stream Pollution Control Board	Mr. Perry Miller
Mr. Forrest C. Neil Metropolitan Sanitary District of Greater Chicago	Mr. Forrest C. Neil
Mr. Ray Ownbey Mr. J. T. Stetson U. S. E.P.A. Region V	Mr. H. Hirt Mr. Jon-Eric I. Stenson

Organization and Representatives Invited	Representatives Attended
Mr. Clint J. Keifer Water and Sewer Design City of Chicago	Mr. Clint J. Keifer
Mr. M. Grant DuPage County Public Works Department	Mr. M. Grant
Mr. Gunnar Peterson Open Lands Project	Mr. Gunnar Peterson
Mrs. Donald Trump Indiana League of Women Voters	Mrs. Donald Trump
Mr. C. Klassen Commerce and Industry Advisory Committee	Mr. H. Koenig Mr. R. Mallatt
Mr. F. Coventry Mr. J. Harvat Local Planning Organization and Sanitary Districts - Advisory Committee	Mr. F. Coventry
Col. J. A. Smedile (Ret.) Northeastern Illinois Planning Commission	Col. J. A. Smedile

Observers

Mr. E. Nelson
USDA - SCS

Mr. J. Ela
Sierra Club

Corps of Engineers Personnel

Colonel Richard M. Wells

Major Leroy R. Hayden

Mr. James M. Maas

Mr. Carl W. Hessel

Mr. William H. Sanders III

Corps of Engineers Personnel

Mr. Jerry A. Sivak

Lt. Thomas H. Blankenship

Mr. M. Ryan

Mr. J. Johnson

Mr. R. Fulton

Mr. B. Pearson

Consultants

Dr. R. Gemmell

Mr. C. Krehelm

Dr. D. Matschke

Mr. D. Fagan

QUESTIONS AND COMMENTS

Following the initial presentation Col. Wells requested comments or questions on the study. The discussion that followed is summarized below.

Q: From a cursory review of Progress Report No. 2, it seems that you have provided very sophisticated advanced biological and advanced physical-chemical treatment systems. However, the design assumptions and some parameters you expect in the land treatment effluent is undocumented for this type of system, even though the report alludes to other types of land treatment systems. Are tests or data being prepared currently to justify the parameters cited?

A: We feel that the amount and quality of data we have on the land system is as good as the data for the biological and physical-chemical processes. We will send you shortly the basis for the land system data and a bibliography of our reference documents. We also have the results of special studies which were performed for the Corps by the University of Washington and by our Cold Regions Research and Engineering Laboratory, in addition to the Pennsylvania State University study.

Copies of this information will be provided you upon request; of course, we are very interested in your critical review of these studies.

Q: We think that the costs for the land system is lower than these costs should be. In fact, you may require a tertiary treatment plant after the land treatment to reach the desired effluent quality. Do you maintain that the Corps has sufficient data to choose the land system?

A: If in fact we could not produce the effluent quality that we expect from the land treatment system, this would of course preclude the choice of this alternative. We do feel, however, that the data we have for the land system is as good as the data we have for the other systems. On a comparative basis, although we must make assumptions and projections for the land system, we must also extrapolate data for the treatment plant technologies. It is difficult to make system performance projections in any of the technologies under consideration, but there is a comparability in our data that allows us to proceed.

C: The design of the land treatment system is based on pilot and laboratory work. The largest pilot system is the Muskegon system, now under construction. Information will be available after this fall when the system begins operation.

For the physical-chemical system, a concern is nitrogen removal by clinoptilolite, certainly not the most well understood nor well managed system at the present time.

In the advanced biological system, a major consideration is the nitrification-

C: Comment, Q: Question, A: Answer

denitrification removal of nitrogen and, particularly the latter, which has some problems associated with it.

C: You may have such problems, but then again you may not. The real problem is whether the nitrification-denitrification is required. Such determinations must be made. The real problem is determination of the critical pollutants. Your determination of critical pollutants is the basis from which the study starts and to me this is the wrong way to start.

Pollutants should be put where they have the least detrimental environmental impact. This is the basis the study should address, rather than complete elimination from the water, since it may not be the complete elimination which has the least environmental impact.

From the viewpoint of a regulatory agency, looking at a "No Discharge of Critical Pollutants" effluent quality goal is too narrow an approach.

A: The study does take a broad approach, following each product of the treatment process through to its final destination on land, air, or water, and assessing the environmental impact of the result.

Q: Unless it is strictly for storage, why does the study consider transporting sludge to the limestone quarry in Indiana? There are fissures throughout this area which may permit seepage to sites perhaps thirty miles distant. Putting sludge in these quarries is entirely different from applying it to strip mines for land reclamation, because such reclamation is not a possibility in the lime quarry.

A: The sludge management alternatives are intended to show the diversity of sludge management options possible. The particular option utilizes a P-C sludge application to quarry areas. This sludge is chemically inert.

C: P-C sludge still has all the chemical constituents in it and they will show up somewhere.

A: The chemical constituents are largely held in the solid phase. For a first look, we felt P-C sludge would be compatible with the limestone quarries. It is not land reclamation in any sense.

Q: Why do the results of this study differ from the recharge studies of Tel Aviv and Tucson?

A: Those systems utilized forced injection to rebuild the ground water supply. The system is similar to the land system of the study but the objective is not necessarily identical to the objectives of our land

system design; this is particularly evident in the different rates of application one would expect to find between the two systems.

Q: What is expected of this committee? Is it to ratify your positions on the alternatives or to suggest additional alternatives?

A: The committee can best help us at present by commenting on our progress and suggesting the future course of action of the study. For example, we would hope to get your comments on which alternatives should be evaluated in more detail and carried forward.

Q: In the land system how many square miles do you anticipate would be required for retention basins?

A: About 100 square miles in 1990, somewhat less than 150 square miles in 2020.

Q: What is the application rate for the effluent?

A: The rate is 3 inches/week for a 7 month application rate.

Q: Are there any problems with growing crops with such a large amount of water?

A: There are no problems that we can foresee since the area is designed to be drained. This is not farming in the usual sense, rather it is controlled drained farming so that the soil system is never saturated. The system is designed additionally to be responsive to natural periods of saturation (i.e. precipitation).

Q: Did you design the system by using average application rates to size the seven hundred square miles needed?

A: The system is designed for a peak application rate of 4 inches/week and an average application rate of 3 inches/week. This flexibility in design can accomodate the anticipated naturally occurring rainy periods during which irrigation must be temporarily terminated.

Q: How do you account for the large part of the land site that has a high water table?

A: This will be handled by hydrologically draining the area, as will be done for the Muskegon system where the ground water level is at the surface.

Q: Does this require lowering the water table in the entire area?

A: The ground water table in the vicinity of the facility will be lowered, but the gradients are of a magnitude to cause only a very small exportation of water.

A local area can be depressed to allow as many feet as is required of permeable soil to develop the soil process, as was done in the Muskegon system where the ground water gradients are shallow.

Q: How large is the spray irrigation area?

A: About 600 square miles in 1990, 1,000 square miles in 2020.

C: Your application rate would exceed natural rainfall in any area of the United States. This seems like too much water to apply.

A: The land system, however, is controlled by agricultural management including underdrains and collectors for recovery of irrigated water. Thus the land remains well drained allowing a successful agriculture to proceed. The evapotranspiration of additional moisture to the surroundings as a result of the irrigation practice is small in contrast to the evapotranspiration moisture already being naturally generated in the irrigation area.

Q: Where is there long range experience in the spray application of secondary effluent to land?

A: Penn State is one of the better examples because the study of the system has been done for an extended period of time. It has also been well documented, which makes the system results exceptionally good.

Although there are many land systems which have been operating for years, most have not been well monitored, which would produce the type of information you want.

One system that does have some degree of comparability has been operating in Melbourne, Australia for the past 80 years. The farming application at Melbourne has maintained both cattle and an agriculture while producing an acceptable effluent. The Melbourne system, however, starts with a raw sewage and, by using the first one or two inches of the soil and a vegetative cover, produces a secondary effluent. By contrast, our analysis considers starting with a secondary effluent, filtering through the ground, and collection of a much improved water.

It is important to note that the Melbourne system is in an industrial area which produces a good cross-section of undesirable waste products, comparable to the C-SELM area.

To find out what has happened to the soil at Melbourne because of the land treatment process, Corps personnel have traveled to the farm to examine the operation. Soil samples taken then are now being analyzed to ascertain what types of accumulation (like heavy metals) has occurred in the soil over the years.

C: When a secondary effluent is applied to the soil system, there is a buildup of humus by the various natural chains of mechanisms which are in the soil. The land process treats the effluent but does allow some effluent constituents to pass through. Those constituents which pass through are much the same as pass through when using treatment plant technology, some

to a greater degree, some less; but we find that the critical pollutants defined by the Corps of Engineers do not seem to pass through. The systems that have been mentioned remained viable through the years. The organic humus which does accumulate in some of the systems in the top layers become an active part of the process, allowing better system performance throughout the years.

Q: Of significant concern is the proximity of the land treatment area in Indiana, which has a very high ground water table, to the Kankakee River. How will lowering the water table affect this river? How deep will the underdrain collection system be?

A: The system is designed not to impact on the river. The system could be designed to impact very markedly on the Kankakee River. For example, because of the rivers hydraulic proximity to the treatment site, the river itself could be utilized as the underdrain to allow great monetary savings. Such an underdrain is not the way the system is designed, but with a high quality water it is a possibility.

Q: It is not evident that the costs comparisons of the different alternatives are at all meaningful. It is recognized that a limited amount of technical data must be extrapolated a long way to predict the cost of advanced treatment plant systems for a very complex mixture of wastes. In many cases cost differences between alternatives are on the order of 5 to 10 percent, while the expected error in the cost estimate may be upwards of 20 percent or, in some cases, an order of magnitude. What system of checks and balances have been built into this study and what provisions for an independent assessment and evaluation of costs have been made?

A: The main check and balance system which should be very effective is the fact that the Corps has other studies being performed concurrent with our study that are being assisted by different consultants from other parts of the country. All data is exchanged between study groups through the coordination of the Office of the Chief of Engineers to compare alternative approaches to similar problems. By comparing the results of these approaches and data, a system of checks and balances is established.

Q: Do each of these regional studies incorporate the same land treatment options and study goals?

A: Each has identical goals and will address the same three technologies identified, although the components of the advanced waste treatment systems are structured independently for each study. If one of the other studies should produce a better combination of components, we will of course obtain and incorporate this information.

Q: What advances have been made conceptually from the 19 alternatives to produce the eleven suggested alternatives? What has been eliminated?

A: In our analysis of combined versus separate collection systems, we felt that the separate system showed no promise so it was eliminated. In our analysis of the spacial site for treatment plants, we found that siting the plants strictly for transportation and corridor considerations did not produce different plans, so this eliminated. Similarly, siting the plants specifically for reuse considerations did not produce any appreciable difference, so it was dropped. We are also carrying forward some of the alternatives as optional add-ons. For example, the synergistic idea was kept.

Q: Is it correct that you have not really eliminated any of the alternatives, but rather have absorbed them into other considerations that are more important to your decision making process?

A: Yes, that is correct.

Q: In alternatives 16 and 17 are the costs reductions resulting from the power generating plants the results of actual negotiations with the power companies as to their willingness to purchase this power? Are the figures conceptual?

A: The figures have not been negotiated but result from a first estimate for this stage of the study. In our more detailed analysis we will coordinate the figures with the power companies, but we are presenting the information to them through the Commerce and Industry Advisory Committee and requesting comments. We are also coordinating with the Federal Power Commission and have obtained data on projected power demand.

Q: One alternative had nine and another eleven 5,000 megawatt power plants. Is this not a large concentration of power plants for a single location?

A: We have learned from coordination with the Atomic Energy Commission that the concentration of power plant facilities is a concern. This is one of the reasons we are looking at dispersion in the synergistic add-on. Although there are of course intrinsic values in concentrating the power systems near the grid system to affect a total system savings, there are nevertheless other considerations. We will conduct a more in depth study of such impacts.

Q: What is meant by "rural stormwater"?

A: We mean runoff from the fields and other rural wastewater which is not collected in sewers.

Q: Will the system collect all the farm underdrain as well?

A: Yes, it will.

Q: In the land system you provide three days aeration before storage in a lagoon. Ordinarily 15 or more days of digestion would be provided. Will you not have odor problems due to solids settling out in the storage lagoons?

A: The bottom of the lagoons will be anaerobic while the top of the water will be aerobic. The solids on the bottom will undergo an anaerobic digestion. The system, in effect, established a screen which eliminates odor problems, except in the spring when there would be a turnover condition with a mild odor. In another year or two we should have a better idea of the severity of the odor problem.

C: Lagoon odors could be a very severe problem. Your sludge age is three days where ordinary activated sludge is held for six days.

Q: How many rural runoff systems are required?

A: The report identified 295 such sites for the year 2020.

Q: It was stated that you will know better in a couple of years the problems associated with the technology proposed. Why, then, are we being asked to make decisions now, rather than then?

A: The study will be complete enough to make good decisions now, realizing of course that the system design may be changed to reflect advances of new technology. Waiting two or three years would not necessarily mean better decisions could be made. Rather, by waiting we may lose the opportunity to think about where present money is to be spent, if in fact our plans are to be long range.

Q: When this study was initiated one of the premises stated was that it would not interfere with the future plans of operating agencies. Yet you have phased out the Hanover Sewage Treatment Plant, which we at the Metropolitan Sanitary District planned to maintain, and you retained the East Chicago Heights Plant, which we plan to phase out. How will you reconcile these differences?

A: Whenever our plans seem to you to be heading in the wrong direction, we would very much want to discuss it with you, particularly so that we can adapt our plan to yours. When we stated that we were not going to impact on existing planning efforts our intention was to produce alternative plans such that if adopted the plans would provide implementation from existing plans. There is no reason to stop local planning to wait for our study to be completed. If you are convinced from our studies that to phase out a few plants would be better than to keep them, then you may decide to do so.

C: For the Metropolitan Sanitary District the deadline of December 1, 1977 has been set for our major plans. This means engineering funds will be committed in the next year. The engineering costs alone to provide tertiary treatment at the world's three largest plants will be millions of dollars.

A: This is one reason why you would have to envison a very large savings to make it economically beneficial to alter your plans. The longer we wait to produce plans, the less can be achieved from the proposed system.

Q: Who performed the cost analysis?

A: The modular kinds of costs were developed by various agencies working for the Office, Chief of Engineers, and by Bauer Engineering, Inc., a consultant to the Chicago District. Use of the cost data and the figures shown in the report are by Bauer Engineering, Inc.

Q: Are the costs associated with the phased out plants included in the total costs of the alternatives?

A: In the final analysis and as the study progresses, we will include the salvage values and unretired debts; but at this early stage the salvage values have not been included.

Q: Did you say the systems would be costed for the year 1990?

A: The costs presented are for the year 2020. We will now go into much greater detail, looking at those portions of the system that must be on line by 1990. The costs will be adjusted to cover the portion of the system required for 1990.

Q: Is one of the reuse considerations to divert water back into Lake Michigan?

A: Yes, it is.

Q: Does the study consider what affect the discharge of an increased solids concentration will have on the south end of Lake Michigan?

A: The study addresses the problems associated with discharge to the Lake.

Q: Does the 100 MGD figure shown on the slide earlier provide for all lockages? (See attachment I-5)

A: For the "typical provision for reuse" slide shown earlier, some 2,000 MGD of other navigational diversions are substituted for Lake Michigan diversion. This is done by piping water from the treatment plants to points where it is utilized for navigation.

Q: Is the 3,200 cfs Lake Michigan diversion limitation being evaluated in terms of the present state allocations?

A: The study does not address itself to changing the present allocation. For the NDCP alternatives, the concern is where to put the treated water rather than "is there enough".

Q: There are three outputs from the system; water for recreational purposes, water for navigation, and potable water. Will the water to be used for these three purposes be be of equivalent quality?

A: Water for each of these needs meets the NDCP standard, although the quality may vary between uses. For example, the rural stormwater is used to the largest extent possible for potable supply in deficient areas. This water differs in quality from water from urban-suburban reclamation facilities. Such water may have a total dissolved solids concentration of 400 mg/l, while there may be only 100 mg/l associated with the rural stormwater.

Q: It is proposed to use lime to strip ammonia from the sludge. For the sludge that the Metropolitan Sanitary District has been transporting to Fulton County, nitrogen is the limiting factor for application. At an application rate of 4,800 mg/l of lime and an air requirement of 300 cubic feet per gallon, we obtained 75 percent removal, a figure much less than you anticipate in the study. What information is the higher figure based on?

A: We too have done experimental work on sludge. The figures that we arrived at using sludge from MSD's West Southwest facility does not vary significantly from the 75 percent removal rate cited. At the equivalent of 1 to 2 dollars per dry ton, we experienced almost a 90 percent removal of available nitrogen from the sludge.

Q: How much air did you use?

A: The amount of air required for the pilot work, which was performed in small laboratory stripping experiments, is not the relevant factor. We stripped the sludge of 90 percent nitrogen in 10 to 15 minutes, but this was not the process we propose for the actual system.

We propose dispersion of the sludge by a process that produces a finely divided sludge of high pH. By blowing the sludge through the air, the nitrogen would be stripped from the sludge in its passage through the air.

Q: Is this process a part of the spray irrigation system?

A: This is part of the sludge management option that was included at the Shawnee National Forest site. The stripped ammonia will fall to the ground and be used for fertilizer.

Q: Because of the magnitude of sludge in the system, will not an error in the

90 percent removal figure be very serious?

A: It is tc discuss these types of technical questions that we would like to exchange data on methodology, on an individual agency basis as necessary.

Q: Will the Corps reproduce the bibliographic references that constitute the data base for the study?

A: The bibliographic data is listed in the report. While we will not reproduce all of these sources, the material is available in the Chicago District offices. We will, however, have available copies of the Penn State Studies (entitled "Wastewater Renovation and Conservation"), the Cold Regions Research Laboratory Report (entitled "Wastewater Management by Disposal on the Land"), and the University of Washington report (entitled "Assessment of the Effectiveness and Effects of Land Disposal Methodologies of Wastewater Management".)

Q: At a recent water supply workshop with several experts in the region, one issue was the utilization of treatment plant effluent for ground water recharge. It was stated that, according to the Illinois EPA, effluent used for ground water recharge must be of drinking water quality. It was also suggested that such high quality water could be used for potable water supply. Is ground water recharge one of the alternatives?

A: Yes, it is one of the reuse alternatives. There is also the possibility of using suburban stormwater runoff for recharge, since the degree of contamination is generally less severe than urban storm runoff.

Q: The State Water Survey has shown that there is a significant water shortage in the area west of the study area. Do the alternatives consider pumping reclaimed water to these water shortage areas, or is all water to be retained in the study area?

A: The potable water that we are distributing from the agricultural areas is indeed transported to this area, predominantly the western suburbs. In option 2, for example, we use a mixture of rural stormwater and reclaimed water from municipal plants for a potable water supply.

Q: Have you considered broadening your scope to integrate solid waste disposal, particularly in areas close to the the central city if you want to reclaim the sites for agriculture, parks, etc.?

A: This is certainly something we will consider.

Q: What consideration has been given to flood control?

A: The study includes an analysis of the quantities of water expected from the design storm. Additionally, flood control benefits will accrue since we store

stormwater, rather than allowing flood conditions.

Q: What is the design storm?

A: It is the largest storm in the 21 years of record, essentially a 100 year frequency satisfying both high intensity-short duration and medium intensity-long duration criteria.

Q: What consideration has been given to sealing the storage and aeration lagoons to prevent seepage? Why is only a fraction of the normal air quantity requirements for this type of system provided?

A: Provision to prevent seepage would depend on the condition and properties of the soil. The lagoons, however, are not located in sandy areas; rather the lagoons are sited in morainal areas of tight soil. In a more detailed plan an analysis of the actual soil conditions will needed,but for the present level of detail of the study we assumed a tight soil.

The amount of air provided sludge in the lagoons is well within the norms of aerated lagoon facilities. Except for the remote corners of the lagoons, the sludge will be kept in complete mix. Our design of these facilities was coordinated with the Lightning Mix and Richard's of Rockford companies, both competent consultants in this field.

Q: Does the study make reference to sludge lagoons with the eventual spreading of sludge on the land?

A: Yes, for the advanced biological facilities, the regional treatment plants will have holding lagoons. Sludge from these lagoons will be transported to an agricultural or other land reclamation site.

Q: Will holding ponds be contiguous to the spray irrigation sites?

A: Yes, as much as possible. We attempt to tailor each particular site by locating the holding lagoons on tight, morrainal type soils while utilizing permeable soil for spray irrigation.

SUMMARY

Col. Wells concluded the meeting with a summary of required future actions that evolved from the meeting.

1. A meeting of technical Committee members will be convened in about a month to discuss technical aspects of the advanced physical-chemical, advanced biological, and land treatment technologies.

2. The Corps will proceed with the eleven alternatives proposed. Back up data will also be provided for the technology utilized in these alternatives.

3. Corps' personnel will meet with groups on an individual basis to discuss unresolved technical problems and questions and to exchange additional information.

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WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

STAGE II - SECTION III

CITIZENS ADVISORY COMMITTEE
CONSERVATION AND ENVIRONMENTAL INTERESTS
(Summary - Second Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

15 June 1972

PREFACE

On 15 June 1972, members of the Citizens Advisory Committee for Conservation and Environmental Interests met with U. S. Army Corps of Engineers, Chicago District, personnel for the second in a series of meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The meeting was held at the Cook County Forest Preserve District Building at 536 N. Harlem Ave., River Forest Illinois.

The purpose of the meeting was to apprise committee members of the status of the study, particularly the development of an initial array of nineteen alternatives. The rationale for development of the alternatives and a descriptive analysis of each alternative was presented at the the meeting. Presented also was a discussion of "add-on" and reuse options, costs, and cost comparisons between comparable alternatives.

Subsequent to this meeting, a follow-up meeting was held on 22 June 1972 at the YWCA, 37 South Wabash Ave., Chicago. The purpose of this latter meeting was to further discuss the study results in Progress Report No. 2 (which was distributed at the prior meeting), and to solicit comments and recommendations as to which of the initial alternatives warrant further consideration.

A summary of both meetings is presented herein. A list of participants at each meeting, summary of the discussion that followed the 15 June presentation, and a summary of the discussion at the 22 June meeting are presented herein.

CITIZENS ADVISORY COMMITTEE FOR CONSERVATION AND ENVIRONMENTAL INTERESTS 15 June 1972 ATTENDANCE

Organization and Represenative (s)

Mrs. Randall Herman
Ill. Wildlife Federation
Cook County Div.

Dr. Jack Snarr
Cook County Clean
Streams

Ms. Lillian Lasch
Ill. Prairie Club

Dr. Hunter Mermall
Salt Creek Commission

Mr. Ralph Frese
North Branch Coalition

Ms. Mary Neff
Friends of the Earth

Corps of Engineers' Personnel

Col. Richard M. Wells

Major Leroy R. Hayden, Jr.

Lt. Thomas Blankenship

Mr. James M. Maas

Mr. Carl W. Hessel

Mr. William H. Sanders III

Mr. Milo Ryan

Consultants to Corps

Dr. Don Matschke

CITIZENS ADVISORY COMMITTEE FOR
CONSERVATION AND ENVIRONMENTAL INTERESTS
22 June 1972 ATTENDANCE

Organization and Representative (s)

Mrs. Helen Meier
Sand Ridge Audubon

Ms. Lillian Lasch
Ill. Prairie Clu

Dr. Marilyn Domer
Friends of the Earth

Mr. Douglas Schoeder
Ill. Planning and
Conservation League

Mr. Hal J. Bohner
Northwestern Students
for a Better Environment

Ms. Donna Schiller
League of Women Voters
of Illinois

Mrs. Eileen L. Johnston
Committee on Lake Michigan
Pollution

Ms. Rosemary Volpi
Ms. N. Storke
DuPage Environmental Council

Dr. Hunter Merrall
Mrs. Maribeth K. Tooke
Mr. John W. Tooke
Salt Creek Commission

Mr. Randall Herman
Mrs. Constance Herman
Mr. Randall Herman, Jr.
Ill. Wildlife Federation
Cook County Division

Mr. George Sawicki
Cook County Clean Streams
Committee

Organization and Representative (s)

Ms. Irene Heyka
Ms. June Joly
Ms. Marie Heyka
Save the Valley Assoc.

Mr. Richard Lapham
Des Plaines River Steering
Committee

Mr. Keith Nicolas
D. R. I. V. E.

Corps of Engineers' Personnel

Major Leroy R. Hayden, Jr.

Lt. Thomas Blankenship

Mr. Carl W. Hessel

Mr. James M. Maas

Mr. Milo Ryan

Consultants to Corps

Dr. D. Matschke

14 JUNE MEETING
SUMMARY OF DISCUSSION

During the brief discussion subsequent to the presentation, members decided to postpone comments in order to allow time to review Progress Report No. 2. A follow-up meeting was thus scheduled for 22 June 1972, although concern was expressed about the small amount of time available for review.

Col. Wells explained that the initial array of alternatives would be reduced on 26 June to a smaller number of most promising alternatives, hence the need for Committee comments prior to that time. Further, the intent at the first screening would be to consider concepts, such as regionalization of service areas, and not to undertake an extensive or time consuming technological analysis. The assistance of the Committee is needed in the elimination of concepts in order to decide which concepts should be retained and/or restructured for further study. The concepts will be restructured based on a "meeting" together of viewpoints from the Advisory Committees.

One of the main concerns expressed at the meeting was the amount of recycling of industrial waste expected, especially for the steel industry. Members were concerned that the recycling amounts suggested by the "ad hoc" committee might not reflect nor be consistent with the amount of recycling of other steel producing industries. Members were assured that they would be given the opportunity to review and comment on any product of the ad hoc committee. The meeting was adjourned until the follow-up meeting.

QUESTIONS AND ANSWERS (15 JUNE MEETING)

During the discussion subsequent to the Corps' presentation, it was decided to convene a followup meeting. The purpose of the meeting would be to further discuss the alternatives and to brief committee members unable to attend the present meeting. Questions and comments from the first discussion are summarized below.

Q: Of the three treatment technologies presented, performance data available for the land system is the least reliable. What is the basis of the system performance data that was shown?

A: The performance data for the land system is as reliable as the data presented for the advanced biological and advanced P-C systems. On a comparative basis, our knowledge of the capabilities of the land system and its reliability is as extensive as it is for the treatment plant technologies.

The basis for the land system performance data are laboratory experiments, pilot test facilities, and various types of land treatment facilities (about twenty in number) operational for a number of years. Although each of these treatment systems is somewhat unique and thus somewhat dissimilar to the land system of this study, we can nevertheless obtain valuable information by analyzing these systems. An example of the type of pertinent information available can be seen by our analysis of a system operating in an industrial city, Melbourne, Australia, for over 80 years.

The Melbourne system differs from the C-SELM land treatment system basically by the quality of influent, the type of land treatment process, and the quality of the resultant effluent. In the Melbourne system, raw sewage flows over a ground cover of grass, penetrates only the first couple of inches of topsoil, and becomes effluent of secondary treatment quality. The grass crop is used to feed cattle and sheep.

In contrast, in the C-SELM system pretreated influent of secondary treatment quality is applied to the land and penetrates through the soil where impurities are removed through various soil mechanisms. The resultant effluent is of advanced treatment quality. Although these two systems differ, an analysis of the soil samples taken from Melbourne is currently being performed by the Corps. In addition to other physical data, the test should identify any harmful effects on the land caused by 80 years of use.

Q: In both the Melbourne system and the proposed land treatment site near the Kankakee River, does the wastewater filter through tens or hundreds of feet of soil?

A: No, both systems utilize only the upper layers of the soil. In the Melbourne system the effluent flows through a grass plot, permeates through the top two or three inches, and is collected in drainage ditches. In the C-SELM "living filter" concept of land treatment, most of the treatment occurs in the first few feet of soil, although other chemical mechanisms occur further down.

Q: Does the upper layer of the soil become clogged, thereby affecting system performance?

A: No, the system is designed to maintain an aerobic layer of organic humus. The aerobic condition allows the soil mechanisms to function. Such a "living filter" helps to maintain soil permeability.

Q: In essence, is the soil built up by solids that are returned to it?

A: Yes, the sludge contains valuable nutrients and soil building materials. Land application of the sludge increases the humus content and fertility of the receiving soil.

Q: Does the arid climate in the Melbourne area affect the application rate?

A: Yes, the Melbourne area has a higher rate of evapotranspiration than the C-SELM area due to the more arid climate in Melbourne.

Q: Does the climate also affect the aerobic layers of the soil?

A: No, evaporation during application will have a cooling affect on the soil. If the soil is kept moist, the aerobic organism activity will continue.

Q: Why was an area like Fulton County chosen? What happens in the spring when the ground is near saturation? Does the application cease or does the effluent flow over the ground rather than filter through it?

A: The Fulton County area is utilized for sludge application and is not an irrigation site. The small amount of water contained in the sludge will evaporate.

Q: What happens to the irrigation areas in the spring when the ground is fully saturated with melting snow and spring rain?

A: The management procedure when the soil is saturated is to stop application. At these times effluent is instead sent to storage lagoons.

The storage lagoons for the single site plan are 100 to 150 square miles, literally a lake. Due to this great quantity of available cooling water, eleven 5,000 megawatt power generating stations can operate in the system. The "lake" acts both as a cooling pond and as a settling basin that produces secondary treatment quality effluent.

Q: Could the heat produced by the power plants be used to allow application during freezing periods?

A: No, this would upset the nitrogen biological balance in the soil. Nitrogen is removed partially by attraction to soil particles but mainly by nutrient uptake capability of plants. Hence the amount of effluent application in winter months would be much less due to the decreased rate of nitrogen removal.

Q: What sludge application rate is proposed?

A: The advanced and conventional biological treatment plant sludges as well as the land treatment sludges will be applied to the land at a rate of 25 dry tons/acre/year. The humus content of the soil will be increased by the sludge application to produce a soil richer in humus content. It will not, however, exceed the humus rich cumberland soils found in this part of the country.

Q: What terminal facilities are at the end of the pipelines?

A: The pipeline used for sludge distribution in Fulton County is connected to smaller pipeline systems. Sludge is applied to the land using a mold-board plow, a device that opens a furrow of land for sludge injection and then recovers the land.

Q: Plowing occurs once yearly. What happens in the winter when you cannot plow?

A: The sludge will be stored.

Q: For the rural storm water facilities, what is the useful life of rural ponds before sedimentation render the ponds useless?

A: Good soil conservation practice is a prime consideration in the management of rural stormwater, especially since water must be moved from the land while minimizing soil runoff. A part of the operating procedure, not only for rural stormwater management but for urban and suburban holding lagoons as well, is dredging and solids removal. These operating practices will prevent a sedimentation buildup.

Q: Does the study consider low pools? This is currently a problem on Salt Creek.

A: Yes, the study addresses the problem of low flow.

The meeting adjourned with no further questions.

QUESTIONS AND COMMENTS (22 JUNE MEETING)

A followup meeting was convened by Major Leroy Hayden on 22 June 1972, to continue discussion of the nineteen initial alternatives, the study progress, and the "screening" of alternatives. A shortened version of the Corps of Engineers' presentation was given for committee members unable to attend the prior meeting. The questions and answers which followed are summarized below.

Q: Are nuclear power generating plants the only type considered?

A: Although only nuclear generating facilities were cited in Progress Report No. 2, the storage lagoons provide cooling facilities for electric power generating facilities that could be nuclear, fossil fueled, etc.

Q: How do you prevent seepage of secondary effluent from the large storage lagoons?

A: The storage lagoons were sited on tight, morainal soils to minimize seepage. However, should a seepage problem develop, the seepage loss will be collected and pumped back to the lagoons.

Q: How do you prevent the streams that carry water to the collection systems from flooding?

A: Wastewater, including stormwater, will be captured by the collection system, not the streams. Flood waters will be collected from the streams by stormwater interceptors located below the streams to capture surface water runoff. The untreated stormwater is thus intercepted prior to entering the streams.

Q: For the single site land synergism alternative having nuclear power plants, was any consideration given to the safety implications?

A: Yes, we considered the safety aspects.

Q: How large a cooling lake is required for the plants?

A: The size of the lake that the plants will utilize is about 100 square miles.

Q: What is the requirement per plant?

A: Each 5,000 megawatt plant requires about 5,000 acres of evaporative surface area.

Q: Are these committee meetings to satisfy legal and funding requirements, or to develop an environmental impact statement?

A: The study will have an environmental impact statement, which is currently being developed. However, the purpose of meeting with different agencies and groups is to determine their outlooks and ideas about our plan. Our effort is to develop a plan that the States can use, since the States are responsible for wastewater management planning. The purpose of advisory committees is to solicit the participation of a variety of interest groups in the planning process. Assessing the requirements of such a broad cross-section of the public while the study is developed will insure that the study results in a viable plan of action.

C: It is very difficult to make an intelligent evaluation of the nineteen alternatives so soon, although the briefing was concise and informative.

A: We are interested in your comments whenever you can formulate them. For the initial screening, we will not eliminate any of the concepts. Rather, we will eliminate the undesirable features of some alternatives.

Q: Should the committee and the Corps contact people concerned with recreation for suggested uses of clean water? For example, the Corps could get plans from the park districts, who should be very concerned with the utilization of reuse water.

A: We have made contact with the park districts. Although our initial contacts did not produce significant results, we will recontact the districts and keep them apprised of the study's status.

Q: Will there be meetings at the towns bordering the rivers in the areas?

A: Corps personnel attempted somewhat unsuccessfully to interest local municipal officials early in the study. Although there was little interest shown at that time, we will try again.

Q: Why is there a need to plan uses for clean water? If it is made available, people will find uses for it.

A: The need exists because we lack knowledge of every local situation; hence we must find a way to discern which needs of competing needs should be satisfied. Clean water must be considered a resource for development. This is one of the reasons for contacting the park districts, since they are land holding agencies and recreational planners.

C: The streams should be kept clean for boating, swimming, etc. If clean water was available in sufficient quantities to satisfy all needs, that would be fine; but we must insure that enough clean water is made available for use in the streams.

Following the discussion, the meeting was adjourned.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

STAGE II - SECTION IV

CITIZENS ADVISORY COMMITTEE
COMMERCE AND INDUSTRY
(Summary - Second Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

 14 JUNE 1972

PREFACE

On 14 June 1972, members of the Citizens Advisory Committee for Commerce and Industry met with U. S. Army Corps of Engineers, Chicago District, personnel for the second in a series of meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The meeting was held in Room 504 of the Everett M. Dirksen Building, 219 S. Dearborn St., Chicago, Illinois.

The purpose of the meeting was to apprise committee members of the status of the study, particularly the development of an initial array of nineteen alternatives. The rationale for development of the alternatives and a descriptive analysis of each alternative was presented at the meeting. Presented also was a discussion of "add-on" and reuse options, costs, and cost comparisons between comparable alternatives.

Subsequent to this meeting, a follow-up meeting was held on 22 June 1972 at the same location. The purpose of this latter meeting was to further discuss the study results in Progress Report No. 2 (which was distributed at the prior meeting), and to solicit comments and recommendations as to which of the initial alternatives warrant further consideration.

A summary of both meetings, a list of participants at each, a summary of the discussion that followed the 14 June presentation, and a summary of the discussion at the 22 June meeting are presented herein.

CITIZENS ADVISORY COMMITTEE FOR
COMMERCE AND INDUSTRY
14 June 1972 ATTENDANCE

Organization and Representative (s)

Mr. John L. Engler
Atchison, Topeka, &
Santa Fe Railway Co.

Mr. Thomas R. Kinney
Interlake, Inc.

Mr. Walter E. Jackson
United States Steel Corp.

Mr. Thomas J. Mulligan
Inland Steel Company

Mr. William D. Hull
G. D. Searle & Co.

Mr. Edwin J. Ballard
Calumet Area Industrial
Development Commission

Mr. R. H. Barnett
P & W Engineers, Inc.

Mr. Harold L. Koenig
Commonwealth Edison Co.

Mr. J. A. Pelletier
Northern Indiana Public
Service Co.

Mr. Ed Miller
Arthur Rubloff & Co.

Mr. Robert F. Collen
Northern Illinois Gas Company

Mr. Fred L. Shanklin
Union Carbide Corp.

Mr. Orville V. Bergren
Illinois Manufacturers' Assn.

Mr. Vernon E. Swanson
Real Estate Research Corp.

Ms. Dorothy Fancher
IC Industries

Corps of Engineers' Personnel

Col. Richard M. Wells

Major Leroy R. Hayden, Jr.

Lt. Thomas Blankenship

Mr. James M. Maas

Mr. Imre Szekelyhidi

Mr. William H. Sanders, III

Mr. Milo Ryan

Consultants to Corps

Dr. Don Matschke

CITIZENS ADVISORY COMMITTEE FOR
COMMERCE AND INDUSTRY
22 JUNE 1972 ATTENDANCE

Organization and Representative (s)

Mr. Paul A. Loop
Lester B. Knight & Associates

Mr. Russ C. Mallatt
Standard Oil Company

Mr. John L. Engler
Atchison, Topeka, &
Santa Fe Railway Co.

Mr. Robert F. Collen
Northern Illinois Gas Co.

Mr. Edward C. Logelin
Midwest United States Steel Corp.

Mr. W. A. Carter
Inland Steel Company

Corps of Engineers' Personnel

Major Leroy R. Hayden, Jr.

Mr. James M. Maas

Mr. William H. Sanders, III

Mr. Milo Ryan

Mr. Imre Szekelyhidi

Consultants to Corps

Dr. Don Matschke

13 JUNE MEETING
SUMMARY OF DISCUSSION

During the brief discussion subsequent to the presentation, members decided to postpone comments in order to allow time to review Progress Report No. 2. A follow-up meeting was thus scheduled for 22 June 1972, although concern was expressed about the small amount of time available for review.

Col. Wells explained that the initial array of alternatives would be reduced on 26 June to a smaller number of most promising alternatives, hence the need for Committee comments prior to that time. Further, the intent at the first screening would be to consider concepts, such as regionalization of service areas, and not to undertake an extensive or time consuming technological analysis. The assistance of the Committee is needed in the elimination of concepts in order to decide which concepts should be retained and/or restructured for further study. The concepts will be restructured based on a "meeting" together of viewpoints from the Advisory Committees.

One of the main concerns expressed at the meeting was the amount of recycling of industrial waste expected, especially for the steel industry. Members were concerned that the recycling amounts suggested by the "ad hoc" committee might not reflect nor be consistent with the amount of recycling of other steel producing industries. Members were assured that they would be given the opportunity to review and comment on any product of the ad hoc committee. The meeting was adjourned until the follow-up meeting.

QUESTIONS AND COMMENTS
(22 June Meeting)

A follow-up meeting was convened by Major Leroy Hayden on 22 June 1972 to continue discussion of the nineteen initial alternatives, the study progress, and the "screening" of alternatives. A shortened version of the Corps of Engineers' presentation was given for committee members unable to attend the prior meeting. The questions and answers which followed are summarized below.

Q: Will the Steering Committee select the alternatives to be carried forward?

A: No, each Advisory Committee will help in making the selection. The only difference between the Steering Committee and other Advisory Committees is that the Steering Committee includes Federal and State agencies responsible for wastewater management planning.

Q: Will industrial pretreatment be included in the next report?

A: If in fact industrial pretreatment is not included in the next report, the fact that it is omitted will be mentioned. It will, however, be included in the report subsequent to the next.

Q: Does the report state that the cost figures are for the present and do not include an inflation factor?

A: No, the report does not address inflation. Costs in the report reflect January 1972 price levels.

C: Then on a cost basis the real cost required to reach the 1990 objectives are hidden due to the large cost difference between projected and real cost that will occur in 1990.

A: Such a difference could or could not occur dependent on future economic conditions.

C: If the present rate of inflation continues, the cost could be two to four times the amounts in the report, depending on whether land acquisition occurs in 20, 30, or 40 years.

A: That could happend, but the ability to make accurate projections of future economic conditions, especially for such a long period of time is extremely limited. It is almost impossible to make accurate projections of this type.

C: Perhaps there should be a panel of economists to make such a projection.

A: Our economists could make the projections, but the problem of forecasting accuracy would still remain.

Q: There are many wastewater treatment facilities presently being constructed or planned that involve substantial expenditures. Many will be built by the time the Corps plans can be implemented. Some of the money for construction of the Corps plan may have already been spent, especially money that might have been available for the add-ons of power generations, recreation, reuse, and land use. These concepts are not even under consideration at the field level.

A: We will continue to consider present plans, but it should be noted that there was much construction planned when the study began. Although scheduled for completion this summer, ground has yet to be broken for many of the projects.

Although there are some significant projects underway, local agencies are not required to eliminate combined sewer overflow. If NDCP legislation passes, then the Corps plans should be adopted as soon as possible.

C: The definition of what constitutes NDCP are quite unrealistic, eg., one part per million suspended solids three parts per million BOD are unrealistically low limitations when compared to any water quality requirement.

A: The parameters and performance data was established to reflect the capabilities of the particular processes rather than by need. The data was developed from reference material and may change as revision is warranted.

Q: In some respects the Corps approach is very encouraging and quite rational, particularly for the control of dissolved solids. The drinking water standard of 750 parts per million dissolved solids constitutes NDCP. Why was the same rational not used in developing the other parameters in terms of need?

A: The critical pollutant list and performance data were developed by the Office of the Chief of Engineers after much investigation. To our knowledge, even the federal EPA has not taken an official position on this list nor developed such a list. Although the parameters will be used for the current study, this does not preclude your recommendations of other parameters.

Q: Do these parameters ignore the assimilative capacity of a stream?

A: The parameters were selected after careful study and represent the limits of our technology and not effluent criteria per se. This is the type of constraint currently under consideration in Congress. The parameters reflect the attempt to attain comparable performance from the three technologies.

C: Members of the committee have no real basis for commenting upon the initial nineteen alternatives. The Corps goal is to minimize the costs while meeting the established objectives, yet the costs figures shown have not been verified. Thus the Committee must postpone comment until these cost figures are confirmed. Some of the cost differences between alternatives are of small enough magnitude to suggest that further study may indicate elimination of the difference or that the costs differ by an order of magnitude.

A: Except for concepts that are obviously inferior, the reduction is directed towards the elimination of concepts rather than the deletion of particular alternatives. We will not eliminate concepts or alternatives that have such little difference as to preclude a valid choice. The first two alternatives, the Reference and Screening Bases, are both designed to meet current standards and will be retained, although the Screening Base will be modified to reflect cost effectiveness and performance efficiency. Each of the other alternatives, each designed for the NDCP standard, will be restructured subsequent to screening.

Q: What consideration was given to incineration as a method of sludge disposal?

A: Incineration is an integral part of physical-chemical treatment and as such is one of the sludge management alternatives.

C: There should be an assessment of costs made independent of the Corps.

Following the discussion, the meeting was adjourned.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN STUDY

STAGE II - SECTION V

CITIZENS ADVISORY COMMITTEE
LOCAL PLANNING ORGANIZATIONS AND SANITARY DISTRICTS
(Summary - Second Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

13 June 1972

PREFACE

On 13 June 1972, members of the Citizens Advisory Committee for Local Planning Organizations and Sanitary Districts met with U. S. Army Corps of Engineers, Chicago District, personnel for the second in a series of meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The meeting was held at the Everett M. Dirksen Building at 219 S. Dearborn St., Chicago, Illinois.

The purpose of the meeting was to apprise committee members of the status of the study, particularly the development of an initial array of nineteen alternatives. The rationale for development of the alternatives and a descriptive analysis of each alternative was presented at the meeting. Presented also was a discussion of "add-on" and reuse options, costs, and cost comparisons between comparable alternatives.

Subsequent to this meeting, a follow-up meeting was held on 21 June 1972, also at the Dirksen Building. The purpose of this latter meeting was to further discuss the study results in Progress Report Number 2 (which was distributed at the prior meeting), and to solicit comments and recommendations as to which of the initial alternatives warrant further consideration.

A summary of both meetings, list of participants at each meeting, a summary of the discussion that followed the 13 June presentation, and a summary of the discussion at the 21 June meeting are presented herein.

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CITIZENS ADVISORY COMMITTEE FOR LOCAL PLANNING ORGANIZATIONS AND SANITARY DISTRICTS 13 JUNE 1972 ATTENDANCE

Organization and Representative (s)

Mr. Donald Eddy
Hinsdale Sanitary District

Mr. Gerald F. Johnson
Hammond Sanitary District

Mr. Roy Adams
Lake County Planning Commission

Mr. John M. Harvat
Illinois Association of
Sanitary Districts

Corps of Engineers Personnel

Col. Richard M. Wells

Maj. Leroy R. Hayden

Mr. James M. Maas

Mr. Carl W. Hessel

Mr. William H. Sanders, III

Mr. Milo Ryan

Consultants to Corps

Dr. Don Matschke

CITIZENS ADVISORY COMMITTEE FOR
LOCAL PLANNING ORGANIZATIONS AND SANITARY DISTRICTS
21 JUNE 1972 ATTENDANCE

Organization and Representative (s)

Mr. Ben J. McEwan
Downers Grove Sanitary District

Mr. Stu J. Kennedy
Wheaton Sanitary District

Mr. Gerald F. Johnson
Hammond Sanitary District

Mr. Merle W. Nicewander
Gary Sanitary District

Mr. F. Leonard Coventry
Sanitary District of Gary

Mr. Donald Eddy
Hinsdale Sanitary District

Mr. Victor R. Burson
Gary Department of Development
and Planning

Corps of Engineers Personnel

Maj. Leroy R. Hayden

Mr. James M. Maas

Mr. Carl W. Hessel

Mr. William H. Sanders, III

Mr. Milo Ryan

Consultants to Corps

Dr. Don Matschke

13 JUNE MEETING
SUMMARY OF DISCUSSION

During the brief discussion subsequent to the presentation, members decided, due both to the limited attendance and need to review Progress Report No. 2, to postpone comment until a follow-up meeting. It was felt that the implementation of an alternative meeting the "No Discharge of Critical Pollutants" effluent standard would have significant impact on the existing sanitary districts. A follow-up meeting was thus scheduled for 21 June 1972, although concern was expressed about the small amount of time available for review.

Col. Wells explained that the initial array of alternatives would be reduced on 26 June to a smaller number of most promising alternatives, hence the need for the Sanitary Committee comments prior to that time. Further, the intent at the first screening would be to consider concepts, such as regionalization of service areas, and not to undertake an extensive or time consuming technological analysis. The assistance of the Committee is needed in the elimination of concepts in order to decide which concepts should be retained and/or restructured for further study. The concepts will be restructured based on a "melting" together of viewpoints from the Advisory Committee.

The meeting was concluded by Co-chairman Coventry, who stated that committee members should be able to make philosophical evaluations of the alternatives within the time constraint. The important factor, he concluded, is the timely completion of the wastewater management study.

SECTION III - QUESTIONS AND COMMENTS
(21 June Meeting)

A follow-up meeting was convened by Major Leroy Hayden on 21 June 1972 to continue discussion of the nineteen initial alternatives, the study progress, and the "screening" of alternatives. A shortened version of the Corps of Engineers' presentation was given for committee members unable to attend the prior meeting. The questions and answers which followed are summarized below.

Q: Alternatives 18 and 19 are concerned with large volumes of water. What consideration is given to the Supreme Court limiting Lake Michigan diversion to 3200 cfs?

A: Both alternatives maintain a water balance within the 3200 cfs diversion limitation. The 3200 cfs is a study design limit for Illinois. No flow is allowed to be diverted by the State of Indiana from Lake Michigan, hence much of the reuse water that is returned to Lake Michigan is to satisfy this requirement.

C: Some Federal and State agencies have recommended complete separation of storm and sanitary sewers to minimize treatments costs (although not in older combined sewers areas where such separation is economically infeasible). Yet in the Corps plan the concept is to utilize existing collection systems and thus to continue to use existing combined sewers. This poses a conflict between separating sewers for more economical treatment, and not separating sewers if, under the NDCP, the stormwater must be treated anyway. This is a real concern.

A: The situation is a real problem for which there is no easy answer. We can only note that if NDCP legislation passes, then combined sewers are practical. If the NDCP standards are never instituted, then combined sewers may not be practical. Philosophies on the separation of sewers based on todays standards may change in the next ten years.

C: The city of Elmhurst undertook a $6 or $7 million program to separate sewers and now regrets that decision.

C: Even after separation in Elmhurst was completed, flow in the sanitary sewers is still six times dry weather flow.

C: If the NDCP legislation does become law, the Corps plan would offer local agencies a "ready made" plan for our consideration.

Q: I "object violently" to the usage of the word "will" throughout the Progress Report, especially when discussing system design. The usage of the word indicates that a conclusion has been made, although the committee members have not had the opportunity to comment.

Of the eight or nine hours spent so far in these committee meetings, only about 1/2 hour has been devoted to discussion amongst committee members; nor has the committee had a meeting without Corps representation. Yet the Corps expects the Committee to have conclusions and discussion in 14 days on systems that will last for 50 years. This is unrealistic.

A: Your concerns for the short time frame are, of course, justified, but nevertheless we do have a very short amount of time in which to complete the study. Also, there is much concurrent planning which will result in large sums of money being committed. For example, Mr. Nicewander has stated that he has to make a decision within a year that involves millions of dollars. If we expanded the study time frame to even two years, both the effect and the usefulness of the study will be diminished. This could be due, for example, to money and other resource committments being made during the two years of study that may be inconsistent with our study recommendations. Hence, now is the time for us to confer with your agencies to jointly produce the best possible plan.

C: If the land system of spray irrigation is utilized, we should apply the system in our own municipal golf courses, but then golfers would not play the next morning after spray irrigation at night. The problem thus reverts back to its origin, the local populace. We should be able to reduce the problem to a manageable size, much less than the astronomical amounts for treatment shown for the alternatives.

A: Present spending, when all treatment in the study area is considered, is not much less than the costs for some of the alternatives.

The cost shown for the alternatives are to treat expected flows for the year 2020. Included are projections of industrial flows, which are considerably lower than present flows.

The reduction is due in part to recycling by industries. We are working with the major water using industries, most notably the coal and petroleum industries, to estimate both the reduction in water usage expected by recycling and the cost to accomplish the reduction. Water usage is one of the key concerns of the study.

Q: Does regionalization result in the economies of scale that was expected?

A: The economies of scale increase up to a point, at about 100 mgd on a cost/quantity of flow graph. After this point the curve tends to approach the horizontal, at which point there is no saving in manpower requirements. Costs associated with larger treatment facilities begin to balance the associated savings.

C: Howard Taft has a significant amount of cost curves (the Smith curves). The peaking point is at 100 mgd. Beyond this there are diminishing returns to scale.

A: The cost curves were developed to include the Smith cost curves and additional data. The Smith curves were based on smaller plants with a theoretical extrapolation of data. We started with these curves and then added our data to the curves, including data obtained from the actual bid tabs of the EPA. In this way, we incorporated a new 100 MGD Milwaukee facility, a 100 MGD secondary treatment facility, and a large polishing filter facility, etc., by plotting this actual data.

Q: The sludge management problem increases with the quantity of sludge. Are not the Smith cost curves for biological systems which have almost no cost for sludge disposal?

A: Yes, and the omission of sludge disposal costs is the problem with the Smith curves. We are running out of lawns to fertilize, so we are looking for farm facilities for sludge application.

Q: Two years ago a master sewer and water plan was completed in Lake and Porter Counties, Indiana. Forecasting was performed for population growth, land use and change, and facilities required to treat the expected increase in wastewater flow. Cannot such planning be done on a local basis, without creating a "grandious" plan, just as cheaply as on a regional basis?

A: If local planning is in fact as effective as regional planning, then this fact should be shown by the inclusion of alternative 1, which is an aglomeration of local plans.

Q: How does each individual agency fit into the regional plans?

A: Alternative 3 shows how individual facilities can be utilized. It shows how the present plans could or would evolve into higher effluent goals if the status quo is maintained. The alternative incoporates all of the existing plans while regionalizing the advanced waste treatment facilities.

Q: How does the study tie into the master plan for Lake County, Indiana?

A: The C-SELM study will evaluate the effect of regionalization of treatment plants in comparison to localized plants.

C: The technology is not yet available to physically or economically meet the effluent quality standards. Sanitary districts are told to conform to the standards, yet there is insufficient research to warrant the large capital expenditures required to do this.

We should effect water conservation in industry. Laundromats and car washes could eliminate detergent caused pollution by themselves.

Q: The ban on phosphate detergents in the Chicagoland area is a good example of regulating sewer use. Have there been any noticeable results?

A: There probably will not be. Much more than 80 percent phosphorus removal is required to produce a noticeable impact on pollution.

Q: If detergent industry can be so regulated, cannot other pollutants also be?

A: Similar constraints can be placed on other industries, but the amount of pollutants resulting from our normal bodily processess would also have to be eliminated in order to impact significantly on the pollution problem. We must evaluate whether it is easier to prevent a certain pollutant at the source or if removal at the treatment plant is preferable.

Q: What would be the result of greatly reducing the amount of water available to the smaller industrial water users?

A: Such a reduction is part of the philosphy incorporated in the flow projections. The commercial and industrial flows are reduced by recycling.

(The comments following are in reply to questions of Co-chairman Coventry to Committee members on desired alternatives)

C: Alternative number 1 will of course be maintained as the reference base. Numbers 4, 7 or 8, 11, 13, 15, 16, and 18 should also be retained.

C: Incineration is sludge management option, but it is a remote one due to the expense.

C: The application of P-C sludge to quarries in Indiana does not reclaim land; rather, it merely fills holes while writing off the land. Although it is the least expensive way to dispose of P-C sludge, the negative aspects should be made known.

In contrast, biological sludge is applied to strip mine areas for land reclamation.

C: Alternative 4 shows promise as the intermediate dispersion of AWT plants. The operating agencies are required by law to give advanced waste treatment, even though such treatment is not defined except for phosphorus removal in the case of Lake Michigan. Regardless of the AWT technology used, such a plan as alternative 4 should produce the expected economies of scale.

The Corps study should concentrate on the costs of chemicals and manpower requirements. There should be some regionalization, but it should be limited.

C: The open space plan, which utilizes green belt areas for land treatment, should be retained because the cities need green belts.

C: In the NIPC plan, 51% of the land in each quarter section is left as open space. By requiring developers having 4 quarter sections or more to follow this open space concept, the green belt is maintained while the population is allowed to increase. However, it is not a green "belt" in the way the Corps plan envisions it.

There is a problem associated with the greenbelt concept. In designing a collection system the footage of sewers is minimized while the number of customers served is minimized to affect a cost efficiency. If the collection system must pass through uninhabited areas due to open space design, then the cost of the collection system is increased unnecessarily.

Q: From an operating standpoint, will there not be penalties in cost associated with open space planning?

A: Yes, but the only "penalty" that occurs is due to the radial spokes emanating from Chicago in NIPC's green belt land use plan. The collection system would have to traverse the natural gravity flow, which is north to south.

Q: The plans show Salt Creek from a certain point being taken to a treatment facility south of the Des Plaines River. Basically, would this not leave Salt Creek dry from the country line down to its confluence with the Des Plaines River?

A: To produce total stormwater mangement, we must literally drain the area. Flow in the area will be the water put back by the reuse add on.

Q: The meeting has been helpful, but during the next phase of the study more should be held.

A: It is the Corps intent to present information to the Committee such that it can be understood and assimulated in the available time. More time should be available during the next phase, which will be more important than the first phase since more detailed engineering will be completed. Information will be forwarded to Committee members for easy and quick assimulation as it is developed.

Following these concluding remarks, the meeting was adjourned.

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

STAGE III: INTERMEDIATE ALTERNATIVES

The material presented herein is a summary of the interaction with the public during the third stage of the study. This stage is highlighted by the evaluation of an intermediate set of 11 alternatives from an initial set of 19. The interaction is described in the summaries of committee meetings. The material is presented in main parts as follows:

Part 1 - Intermediate Advisory Committee Meetings
Part 2 - Technological Issues
Part 3 - Socio-Environmental Impact Analysis Methodology
Part 4 - North Branch of the Chicago River
A Resource Development Plan
Part 5 - Questions Raised in Citizens Advisory Committee Evaluation
of C-SELM Progress Report No. 2

STAGE III - PART I

INTERMEDIATE ALTERNATIVES

TABLE OF CONTENTS

TABLE OF CONTENTS CONT'D

PART I

CORPS OF ENGINEERS' PRESENTATION

SECTION I - TECHNOLOGICAL ISSUES

Subsequent to introductory remarks and a brief preview of the meeting agenda, Col. Richard M. Wells presented a series of questions that evolved from prior meetings of the various committees and, in several cases, from meetings with individual groups of committee members held to discuss technical aspects of the systems. These questions and comments are summarized below. They are addressed in more detail in a paper entitled "Technological Issues" which was provided all committee members.

The first question is - is the "No Discharge of Critical Pollutants" (NDCP) standard too strict?

Congress specifically directed the Corps to evaluate alternatives for "The Elimination of Pollutant Discharges." Considerable effort has been expended by the Corps at both the Washington and Chicago levels in defining constituent levels that meet this Congressional directive. The figures are the product of this effort. The rationale for our conclusions is described in a report entitled "Technological Issues". By carrying forward the existing standards alternatives, the study will provide a basis for comparing the costs and benefits associated with the high and the existing standard levels.

The second question was a request for additional documentation of the capabilities identified for each of the advanced treatment systems. This documentation is included in "Technological Issues". It is the Corps contention that the system capabilities data presented represents the best information available. It should be recognized that none of the three systems have been operated and rigorously tested in a large scale facility.

The third question is - if treated water is returned to Lake Michigan, will the salt buildup harm the lake?

Analysis reveals that this poses neither a short nor a long range threat to the lake.

Should stream bottom sludge deposits be removed?

This study plus a study conducted for the Metropolitan Sanitary District of Greater Chicago indicate that this is not necessary. When the addition of pollutants to the streams ceases, the old pollutants will, in time, become inactive and will no longer degrade water quality.

Are predictions of industrial waste reduction by recycling too optimistic?

We are presently working with representatives of industry to develop mutually acceptable projections.

Several questions were raised relative to the land treatment system.

First, will land treatment lagoons produce odors in the spring?

It is possible that lagoon turnover in the spring could cause some odor. However, based upon Canadian tests, it is felt that proper design and control of lagoon depths can be used effectively to minimize this problem.

Will land treatment lagoons grow algae that will interfere with irrigation?

Algae will grow. However, this should not interfere either with the mechanical equipment used in irrigation or the performance of the living soil filter.

Will land treatment lagoons require more power to operate than has been estimated?

The current estimates are considered to be valid. They are based upon a mixing or stirring technique rather than a technique of introducing oxygen; the latter technique would require several times more power.

Will wastewater become septic during conveyance to the land sites?

There are examples in the Chicago area which show that this will not be a problem. The planned combination of steep tunnel slopes and 1,100 feet of lift applied in route by pumps should aerate the wastewater sufficiently to keep it from becoming septic.

It was suggested that pilot plant operation of the land treatment system should begin immediately.

The joint local, State and Federal EPA sponsored land project at Muskegon, Michigan, will be in operation this year. The Corps is also investigating the possibility of developing one or more other land treatment projects at military civil works sites. These projects, of course, will not produce operational data prior to the end of this study.

To reinforce the performance data now available for land systems, the Office of the Chief of Engineers is collecting data from similar, though not identical, systems that are now operating in the United States, Australia and Mexico. This data will be incorporated in the study as the data is received.

Any land-treatment alternative that might be included in the final array of alternatives would involve a phasing-in period which could serve as a final pilot plant operation.

Reed Canary grass has been mentioned as a suitable crop for land irrigation areas. Is this grass unpalatable to cattle?

Reed Canary grass can be pelletized and made palatable for cattle. However, this grass is only one of many crops suitable for a land irrigation area. The study has not as yet settled on an array of crops for the system. This array is affected by many factors that will be investigated in the next phase of the study.

And last, will land treatment wastewater with its high ammonia-nitrogen content kill germinating seeds?

It is not anticipated that the ammonia concentrations associated with typical secondary effluents (15-20 mg/l) will have a debilitating effect on seed germination. The agricultural considerations of the Cold Regions Research and Engineering Laboratory (CRREL) and the University of Washington reports did not identify any such problems. Further attention will be given to this item.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

STAGE III - PART I

CITIZENS ADVISORY COMMITTEES

(Summary - Third Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

SECTION II - C-SELM REPORTS

INTRODUCTION TO "SOCIO-ENVIRONMENTAL IMPACT ANALYSIS METHODOLOGY

A group of local academicians has developed a system of matrices to help assess the socio-environmental impacts associated with each alternative wastewater management system.

In Matrix A, six elements of each treatment system are rated in terms of the impact that each system element will have on each of 14 environmental elements.

The treatment system elements considered are:

(1) Collection, transportation and storage of input water (2) treatment facilities, (3) treatment processes, (4) liquid effluent and reuse, (5) sludge management, and (6) synergisms.

The environmental elements considered are: surface water quality and quantity, subsurface water quality and quantity, air quality, sensory quality of the environment, present and potential land use and facilities, soil quality, mineral resources, energy, access, biotic communities and unique or rare things.

Matrix A will be used to develop 6 times 14 or 84 ratings for each treatment system alternative as the first step in the analysis process illustrated by this formula,

Primary Impact Category		Human Impact Table		Human Impact Table	
[System [Elements]	x	[Primary [Impact [Category]	=	[System [Elements]	x
Matrix A: Impact Table		Matrix B: Human Impact Table		Matrix C: System Element Impact Table	

Human Activities Weights		
[Human [Impacts]	=	[System [Elements]
Matrix V Human Activities Weights		System Element Scores

Attachment II-1 shows the type of matrix rating form used in developing input for a simple computerized routine that performs required arithmetic calculations. Code numbers are used to identify who is making the rating; which wastewater system is being rated; which element of the wastewater system, such as the treatment facilities, is being rated; and whether the whole region or some portion of the region is being considered. The rater then assigns a judgemental value to the impact that the system element will have on each environmental element; these values vary from -3 to +3 depending on whether the rater considers the impact to be extremely, moderately or slightly negative; neutral; or slightly, moderately or extremely positive. The computer averages the ratings produced by all raters.

The average ratings developed for each environmental element in Matrix A are used as input to Matrix B which assesses the impact of environmental conditions on human activities. The human activities considered are: commercial, industrial and food production; construction, public and private services; residential activity; migration; population density; health and safety; employment; income; cultural and educational activities; public finance; recreation; aesthetics; ecosystem status; and political and sociological activities. The 84 ratings produced for each alternative in Matrix A are multiplied by the 19 ratings developed for each environmental element in Matrix B to produce nearly 1,600 ratings that are stored in the computer memory.

Relative value ratings shown below for the socio-environmental importance of each of the 19 human activities have been developed by 14 academicians in our evaluation teams. The values may be a subject for critique by the committee. These value weightings are multiplied times the appropriate ratings developed previously to produce an adjusted series of ratings which can be summed by the computer to produce a total rating for the alternative and ratings for separate system elements as desired.

Inputs to this type of matrix system are largely judgemental and the numbers produced must be used with judgement. However, this is a valuable technique for blending judgemental opinions of individuals representing a broad spectrum of socio-environmental backgrounds. Additionally, the technique highlights areas warranting additional evaluation and qualitative discussion.

INTRODUCTION TO THE "NORTH BRANCH OF THE CHICAGO RIVER RESOURCE DEVELOPMENT PLAN"

Two goals for the C-SELM Study were identified at the last committee meeting. First, development of effective wastewater management systems

which could be used to control water quality and flows in the regions waterways. Second, development of a supporting program for the restoration, preservation and utilization of the region's environmental resources. As a first step in meeting the second goal, we are developing a prototype plan for the North Branch of the Chicago River. (See Attachment II-2)

This prototype presents a river corridor greenbelt concept that includes: control of land along the river flood plain through fee acquisition of some land for public use, restrictive land use easements on other land and open space zoning of the remaining land; restoration and preservation of the aquatic and terrestial ecosystems throughout the corridor; and provisions for diversified recreational opportunities, such as hiking, bicycling and nature trails, launching and take-out areas for non-powered boats, camp sites, picnic grounds, and general recreational facilities.

The draft of the prototype study provided members has been developed in coordination with the Citizens Advisory Committee for Environmental and Conservation Interests, the communities, park and forest districts along the North Branch, the Northeastern Illinois Planning Commission, the Lake-Porter County Regional Transportation and Planning Commission, and appropriate federal and state agencies.

Such coordination is continuing in an effort to finalize the study soon with refined cost data and development concepts. The study will then be extended to the other major streams in the C-SELM area and a plan proposed for connecting open land corridors.

INTRODUCTION TO "EVALUATION OF INSTITUTIONAL, FINANCIAL AND MANPOWER FACTORS"

The third document for committee review is an Institutional Factors Report. This report presents a cross section of the state, regional and local institutions directly or indirectly involved in wastewater management. The report characterizes the organizations in terms of types of institutions, their geographic flexibility and their authority and functions; discusses the flexibility of the institutions' revenue sources by identifying their financing methods, restrictions, and allowances; describes the elements affecting manpower availability such as job regulations, training opportunities and certification, compensation, job image and career ladders; and identifies the existing manpower situation in these institutions. (This report was mailed to members subsequent to the meeting.)

INTRODUCTION TO "TECHNICAL PROGRESS REPORT NUMBER 3"

Major points presented in the fourth document relative to the basis used for system design are highlighted by a change in the concept for stormwater control and treatment systems design, collection and conveyance systems, wastewater quantities, water management, sludge management and synergisms.

The report includes the following: Comparisons between the three advanced wastewater reclamation technologies considering resource requirements, effluent water quality, the impact on air and water, and reliability; eleven alternative wastewater systems and their estimated total yearly costs; a comparison of the alternative systems (the description of this comparison will be postponed until the next screening meeting to provide members time to review the report); and finally an outline of other technical analyses that will be completed in the next phase of this study. These elements of the report are described below.

Stormwater Control and Treatment Systems Design

A significant change has been made between Progress Report Numbers 2 and 3 in two concepts employed in designing waste treatment systems. First, wastewater storage system capacities have been increased and regulated pump-out employed to reduce the treatment and conveyance facility capacities required. Second, dispersed stormwater storage has been provided in suburban areas to reduce the required conveyance system sizes and to provide areas useful for recreational activities.

Collection and Conveyance Systems

Designs in the report of collection and conveyance systems differ for urban, suburban and rural areas. In urban areas, municipal, industrial and storm wastewater is combined and conveyed in tunnels. Combined storage capacity equivalent to 2.5 inches of runoff is provided. Attachment II-3 shows the urban portion or combined sewer portion of the C-SELM area.

In suburban areas, stormwater is collected separately in surface ponds or deep pits depending on land availability. Sufficient storage capacity is provided for 2.85 inches of runoff. Stormwater is conveyed from the storage areas by gravity or force mains to access points where it is combined with other wastewater. The access points either adjoin a treatment plant or are connected to a large combined conveyance system leading to a regionalized treatment plant or land treatment facility.

Attachment II-4 illustrates the basic suburban stormwater management system utilizing surface and deep pit stormwater storage sites. These storage sites are dispersed to enable local suburban drainage systems to deliver stormwater directly to the storage areas. Stormwater moves from the storage areas through existing or future regulated suburban conveyance systems to the access points indicated by black circles.

In the rural areas, the basic approach is to utilize adjacent stream impoundments supplemented as necessary by excavation and/or dike impoundments to capture and regulate the storm runoff. Land application of the water will follow.

The design for this rural system consists of 422 rural units of 2,000 acres each. Within a typical unit a permanent pond would occupy 100 acres and the land treatment site 240 acres. The remaining 1,660 acres is the tributary area providing runoff to the pond. These 1,660 acres will have essentially the same land use as they now have and will be consistent with good conservation practices necessary to prevent runoff into the streams.

Attachment II-5 is a conceptual drawing of a rural facility that was shown at the last meeting. It includes a detention pond with a permanent pool available for recreational use, a pump station, irrigation rigs on agricultural land, and a pump system to reclaim the purified water.

Wastewater Quantities

The table below shows the estimated domestic-commercial, industrial, and storm wastewater quantities in MGD for the present, 2020 and 1990. We are currently working through an advisory committee with representatives of industry to develop revised recycling and wastewater discharge figures for 1990 and 2020.

WASTEWATER QUANTITIES

	MGD		
	Present	2020	1990
Domestic - Commercial	1000	1720	1235
Industrial	3450	1205	1240
Storm	1185	1155	1155
	5635	4080	3630

Water Management

In designing each alternative system, consideration was given to maintaining a water balance in the C-SELM region. Attachment II-6 schematically portrays a water reuse balance for 1990 flows in a typical NDCP alternative.

Incoming rural stormwater is expended in flows to the lake, as groundwater resupply and the resultant replenishment of inland streams, and as treated water used as a source of potable water. This rural runoff water, coupled with water from the lake and underground acquifers, is the raw source of potable water that is expended resulting in either wastewater flows or replenishment of groundwater and streams through uses such as lawn watering.

Wastewater processed at treatment plants is reused as resupply to recreational and navigational streams and to Lake Michigan. Lake Michigan supplies water for municipal, commercial and industrial use and for streamflow augmentation.

The table below illustrates the water reuse quantities employed in the alternatives for water supply, maintenance of recreational stream flows, water transfers to avoid flooding streams, and navigation flows. These values vary with the number and distribution of treatment facilities in each alternative. The maximum Lake Michigan diversion employed was 1,600 MGD which equates to 2,480 cfs, a quantity less than the 3,200 cfs Supreme Court limit on diversion.

WATER MANAGEMENT

	MGD
Water Supply Need	276
Recreational Stream Flow	201
Water Transfer to Avoid Flooding	76-915*
Navigation Flow	700-2609*
Lake Michigan Diversion	700-1600**

Sludge Management

Based upon the analysis of sludge management alternatives in previous reports, we have dropped the alternatives employing the following: a quarry site in Southern Indiana for disposal of physical-chemical sludge; land reclamation sites in the Shawnee National Forest; and total sludge incineration. Progress Report Number 3 carries forward the evaluation of land reclamation sites in Fulton and Knox Counties, Illinois, and of the use of sludge for fertilizer on nearby agricultural sites in Illinois and Indiana.

Synergisms

The report expands the previous analysis of two synergisms:

- Combined use of open space for both recreation and controlled irrigation treatment of rural and suburban stormwater.

- And the co-location of power production and land treatment facilities allowing use by the power companies of stored wastewater for waste heat dissipation and in pumped storage storage stations provided to meet peak power demands.

* Value depends upon number of treatment plants in system.

** 700 MGD is 1085 cfs, 1600 MGD is 2480 cfs.

COMPARISONS OF THE THREE ADVANCED RECLAMATION TECHNOLOGIES

The table below compares the resources required by the advanced biological, physical-chemical and land treatment processes to treat 100 MG of wastewater. The resources identified are in tons of chlorine, lime, carbon and clinoptilolite; cubic feet of natural gas; and megawatt-hours of electricity. Chlorine requirements are similar for all three processes. The land process requires no lime, carbon, clinoptilolite or natural gas but requires more than the physical-chemical process, and no clinoptilolite, while the natural gas requirement for these two processes is similar.

RESOURCE REQUIREMENTS

	ADV. BIO.	P-C	LAND
Chlorine	3.3 tons	3.3 tons	3.3 tons
Lime	46.0 tons	56.4 tons	None
Carbon	0.9	1.9 tons	None
Clinoptilolite	None	25.0 tons	None
Natural Gas	3.0 x 106 cu. ft.	3.0 x 106 cu. ft.	None
Electricity	360 MW hours	360 MW hours	765 MW hours

All three processes produce effluent of fairly equal quality. One significant difference lies in phosphorus removal - the treatment plants reduce phosphorus concentrations to .1 milligrams per liter while land treatment reduces phosphorus to a lower level of .01 milligrams per liter. Phosphorus contributes to algae bloom or eutrophication in lakes.

None of the processes remove all dissolved solids; however, the 350 to 400 milligrams per liter remaining in the effluent from each process does not appear to pose a short or long term threat to Lake Michigan.

Attachment II-7 outlines the impact of the three technologies on the air. Critical air pollutants (nitric oxide, sulfur dioxide and particulates) measured in tons per day produced by treating 3,000 MGD are shown for the advanced biological, physical chemical, and land treatment processes. The worst impact would come from the physical-chemical system which employs incineration processes which contribute significant pollutants to the air in the form of nitric oxides and particulates. The advanced biological process produces less oxides but an equivalent level of particulates. None of these pollutants are emitted by the land system.

Odor problems associated with the treatment plants would be minimal; however, any odors produced will be quickly noticed since the plants are located in densely populated areas. With the land system, significant short term odors could be produced by lagoon turnover in the spring; however, it is believed that with proper lagoon depth design, this problem can be minimized.

The primary impact on the air resources produced by the land system would be the aerosol spray associated with the spray irrigation systems and the aeration lagoons. Public concern for this problem can be reduced by chlorinating the water prior to spraying, by reducing the amount of irrigation rig aerosol with low spraying pressures, and by buffering the lagoons with trees and irrigation sites. A similar but lesser problem may be produced by aeration facilities at advanced biological plants.

As mentioned earlier, all systems produce sludge which can be used in land reclamation or in enhancing the productivity of agricultural lands. The systems differ in the impact produced by establishing treatment facilities on the land. The treatment plant systems employ a small amount of land located in areas of high population density. On the other hand, the land treatment systems employ a very large amount of land in areas of low population density. Because of the differences in population densities, all three systems involve the relocation of similar numbers of people. The large commitment of land area to a land system would have to be balanced with planning to insure that this land continues to produce a useful crop. While cost estimates included in the study to date envision fee acquisition of the land, in the next phase of the study arrangements, such as agreements with farmers whereby they continue to farm the land, will be identified. In such an agreement, the farmers would gain a new drainage system, free fertilizer from the water and perhaps an easement fee in return for the restrictions imposed by the system on their freedom of operation.

The report presents a discussion of system reliability which is summarized below.

The advanced physical-chemical and the land systems are roughly equivalent in reliability: The physical-chemical system is not susceptible to problems from toxic spills or heavy rainfall but has a significant susceptibility to mechanical failure; the land system has a low susceptibility to all three problems.

The advanced biological systems appears to be the least reliable of the three systems since it has a significant susceptibility to toxic spills and mechanical failure and some susceptibility to problems from heavy rainfall.

INTERMEDIATE WASTEWATER MANAGEMENT ALTERNATIVES

The eleven alternatives which emerged from the first screening are analyzed in this report are outlined on Attachment II-8.

These alternatives are differentiated by effluent quality - either the existing standards or the NDCP standard; by the number and type of treatment sites - biological, physical-chemical or land; and by other factors.

Alternative A, the existing regional plans, and Alternative B, the screening base, achieve existing water quality standards with 64 and 41 biological plants, respectively.

The remaining nine alternatives are designed to achieve the "No Discharge of Critical Pollutants" standard. The first four of these alternatives, C through F, are each designed with two options - either all biological or all physical-chemical plants. They are structured to evaluate the effect of different degrees of plant dispersion: 64, 41, 17 or 8 plants.

Alternative G is designed as a combination 17 plant system. In this system, the five largest existing plants -- the North Side, West-South West, Calumet, Hammond and Gary plants -- are converted to advanced biological plants and employed in combination with 12 physical-chemical plants.

Alternatives H and I employ the land treatment system. In Alternative H, a single large site in the Kankakee River Basin in Indiana and Illinois is employed while Alternative I employs six dispersed land sites that include a smaller version of the Kankakee site in Indiana, a Will-Grundy-Kankakee County site in Illinois, a Kendall County site, and three McHenry County sites.

Alternative J is an advanced biological-land treatment combination. It includes the five advanced biological plants described for Alternative G plus scaled down versions of the six land sites described for Alternative I. Alternative K is similar to Alternative I. However, it procures open land space for combined use for recreation and controlled stormwater irrigation application. With this open space spray application, the six land sites are reduced somewhat in size.

Attachment II-9 compares the total annual costs developed for each of the alternatives with separate bars shown for the physical-chemical and advanced-biological options developed for Alternatives C, D, E and F. Costs without stormwater treatment beyond that envisioned with existing plans are shown in black, with stormwater add-ons shown with the extensions.

The existing standards alternatives are the least expensive and are nearly equal in cost. In Alternatives C through F, the physical-chemical options all cost less than their corresponding biological plant options. Alternative E, with 17 plants is the least expensive of the treatment plant alternatives for both the biological and the physical-chemical plant options. Alternative G with a combination of 5 biological and 12 physical-chemical plants is more expensive than the physical-chemical options in Alternatives C through F and less expensive than their biological options.

Land Alternatives H and I are significantly less costly than any of the NDCP plant alternatives. Six site Alternative I costs approximately $11 million per year more than the single site Alternative H. Combined plant and land Alternative J approaches the pure plant alternatives in cost.

Alternative K with the synergistic use of open space and full stormwater treatment costs is approximately $154 more per year than the corresponding six site Alternative I. The report estimates synergistic power add-on savings for the land alternatives of over $200 million per year, which would reduce total costs for land Alternatives H and I to levels approximately equal to the existing standard costs for Alternatives A and B.

FUTURE TECHNICAL STUDIES

Progress Report No. 3 identifies the technical studies that will be completed during the next phase of the study. These include:

- detailed modular designs of the facilities included in the five alternatives that emerge from the next screening. The modular designs will include plant layouts, O & M cost breakdowns, and energy manpower and other resource requirements.

- an analysis of future industrial water recycling with projected flows and associated costs.

- a more detailed analysis and design of rural stormwater treatment systems.

- large quantities of rock will have to be excavated from the pits and tunnels included in all alternatives. A costed and evaluated management system will be developed for transporting and placing the rock where it can serve a useful purpose.

- and finally, non-structural items will be investigated, including control of soil erosion at construction sites, better septic tank systems and the use of water meters.

STATUS OF STUDY

Attachment II-10 is the study approach diagram described in earlier meetings. The study is at the beginning of the screening of the intermediate set of eleven alternatives.

During September, the technical, socio-environmental, and institutional members of the study group will evaluate these alternatives and make recommendations concerning which alternatives should be retained for final detailed analysis. Then in September the Committee will meet again to offer comments concerning the four reports and suggestions concerning the alternatives that should be carried forward.

After the final screening shown on the attachment the draft report and draft Environment Impact Statement will be completed and presented to the committee for review and comments.

The end of March completion date for the final report has not changed.

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A MATRIX RATING FORM

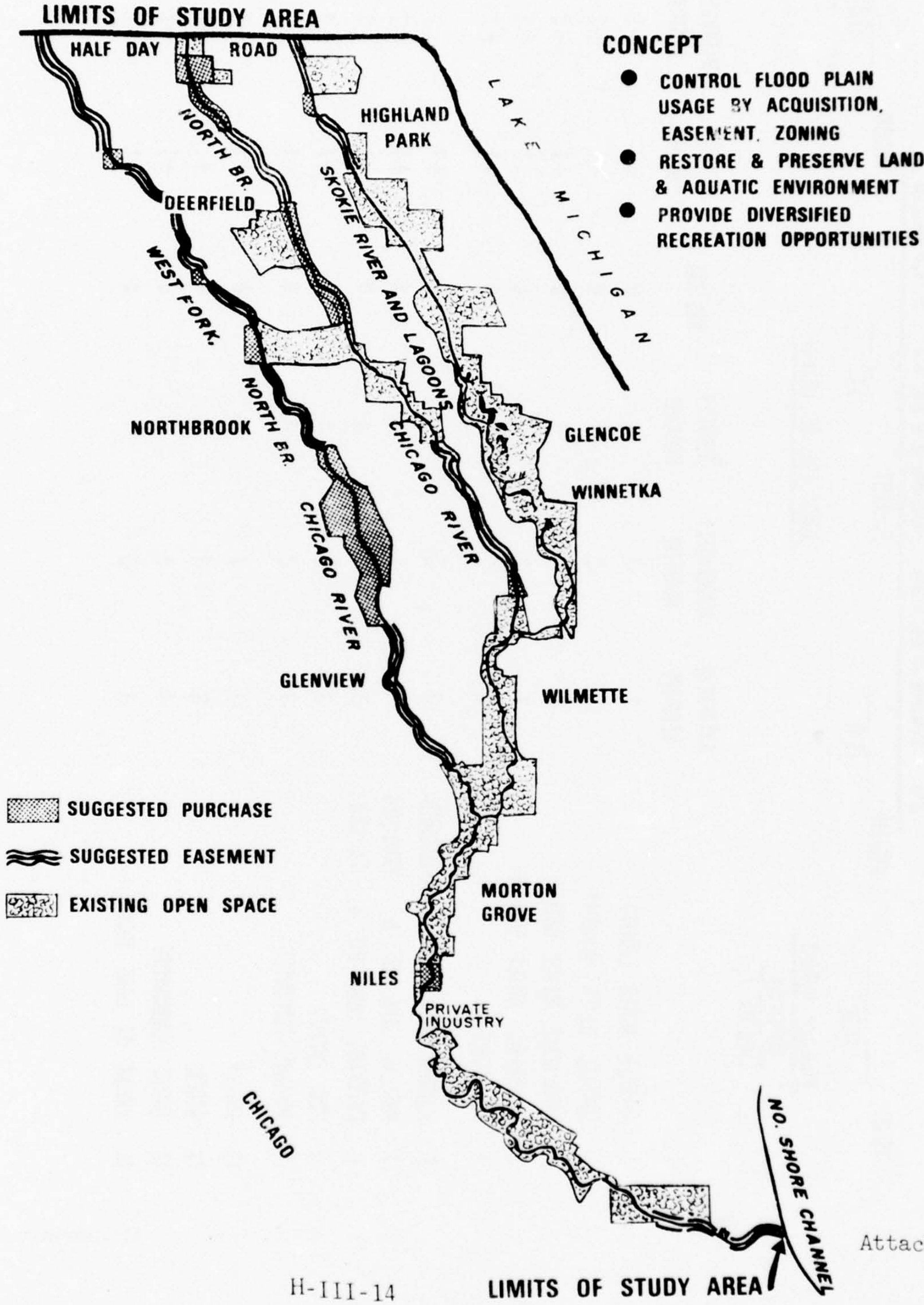
JUDGE: ___ ___ (1,2)   SYSTEM: ______ (3,4)   ELEMENT: ______ (5,6)   REGION: ______ (7,8)

PRIMARY IMPACT CATEGORY (VECTOR E)	MAGNITUDE OF CHANGE						
	EXTREMELY NEGATIVE	MODERATELY NEGATIVE	SLIGHTLY NEGATIVE	NEUTRAL	SLIGHTLY POSITIVE	MODERATELY POSITIVE	EXTREMELY POSITIVE
1. SURFACE WATER QUALITY	-3	-2	-1	0	+1	+2	+3
2. SURFACE WATER QUANTITY	-3	-2	-1	0	+1	+2	+3
3. SUBSURFACE WATER QUALITY	-3	-2	-1	0	+1	+2	+3
4. SUBSURFACE WATER QUANTITY	-3	-2	-1	0	+1	+2	+3
5. AIR QUALITY	-3	-2	-1	0	+1	+2	+3
6. SENSORY QUALITY OF ENVIRONMENT	-3	-2	-1	0	+1	+2	+3
7. PRESENT LAND USE & FACILITIES	-3	-2	-1	0	+1	+2	+3
8. POTENTIAL LAND USE & FACILITIES	-3	-2	-1	0	+1	+2	+3
9. SOIL QUALITY	-3	-2	-1	0	+1	+2	+3
10. MINERAL RESOURCES	-3	-2	-1	0	+1	+2	+3
11. ENERGY	-3	-2	-1	0	+1	+2	+3
12. ACCESS	-3	-2	-1	0	+1	+2	+3
13. BIOTIC COMMUNITIES	-3	-2	-1	0	+1	+2	+3
14. UNIQUE OR RARE THINGS	-3	-2	-1	0	+1	+2	+3

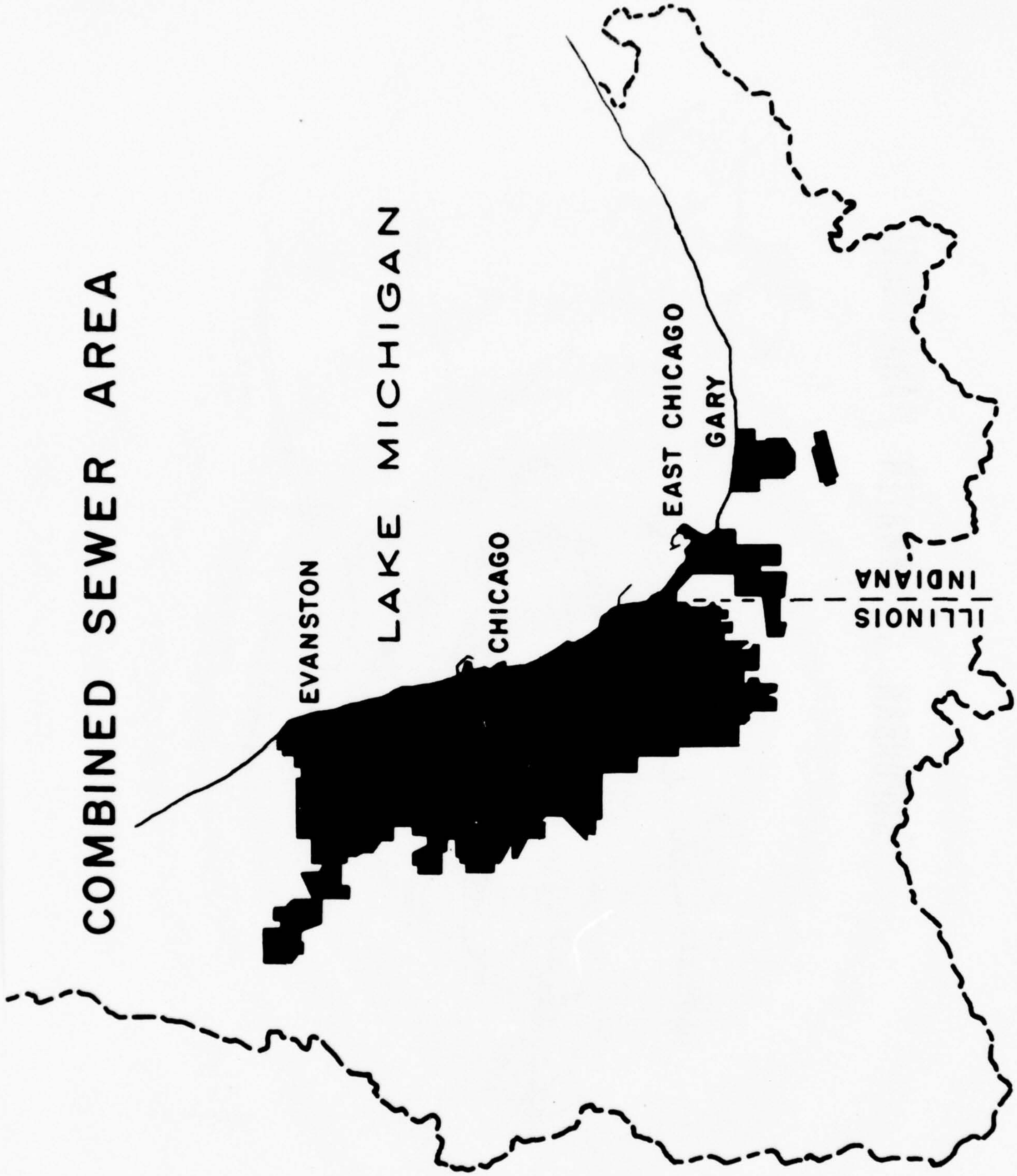
Attachment II-1

NORTH BRANCH, CHICAGO RIVER

PROTOTYPE STUDY

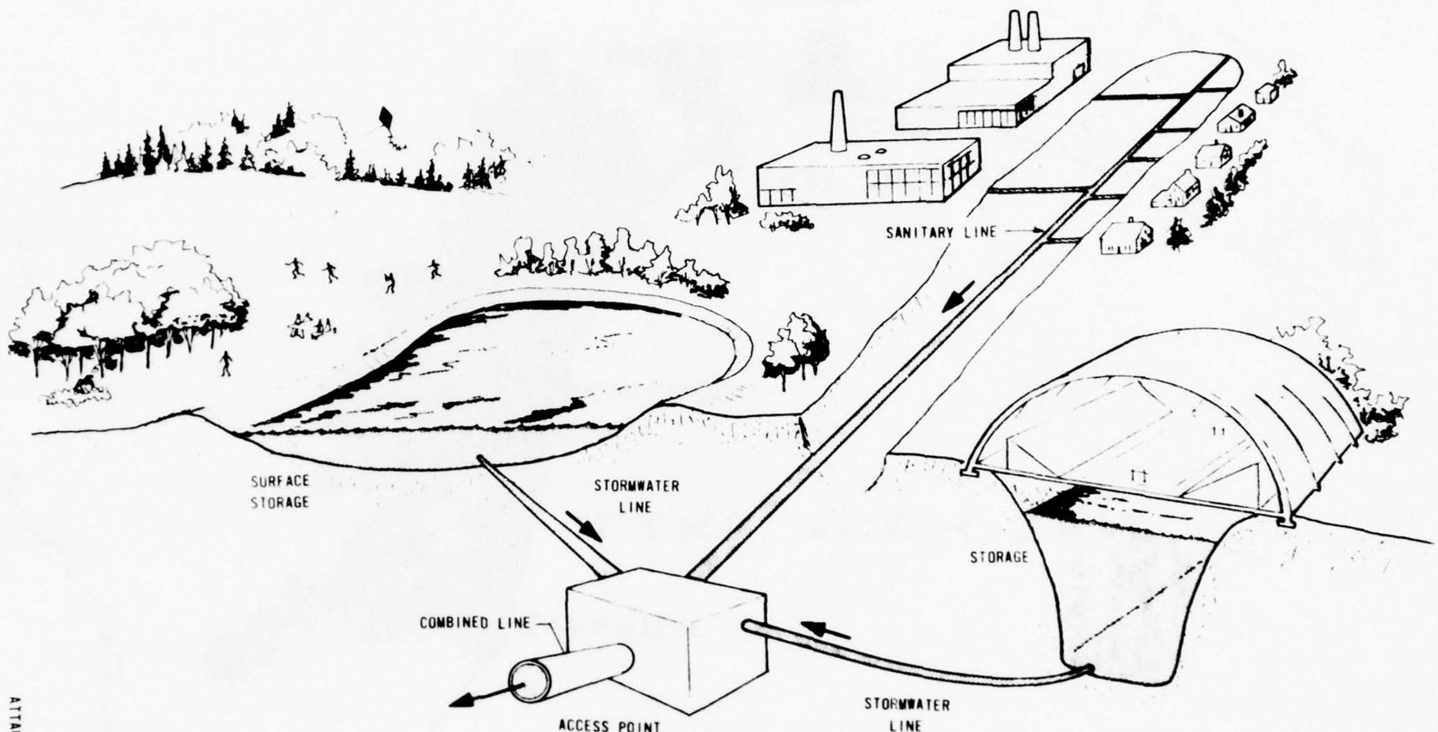


Attachment II-2



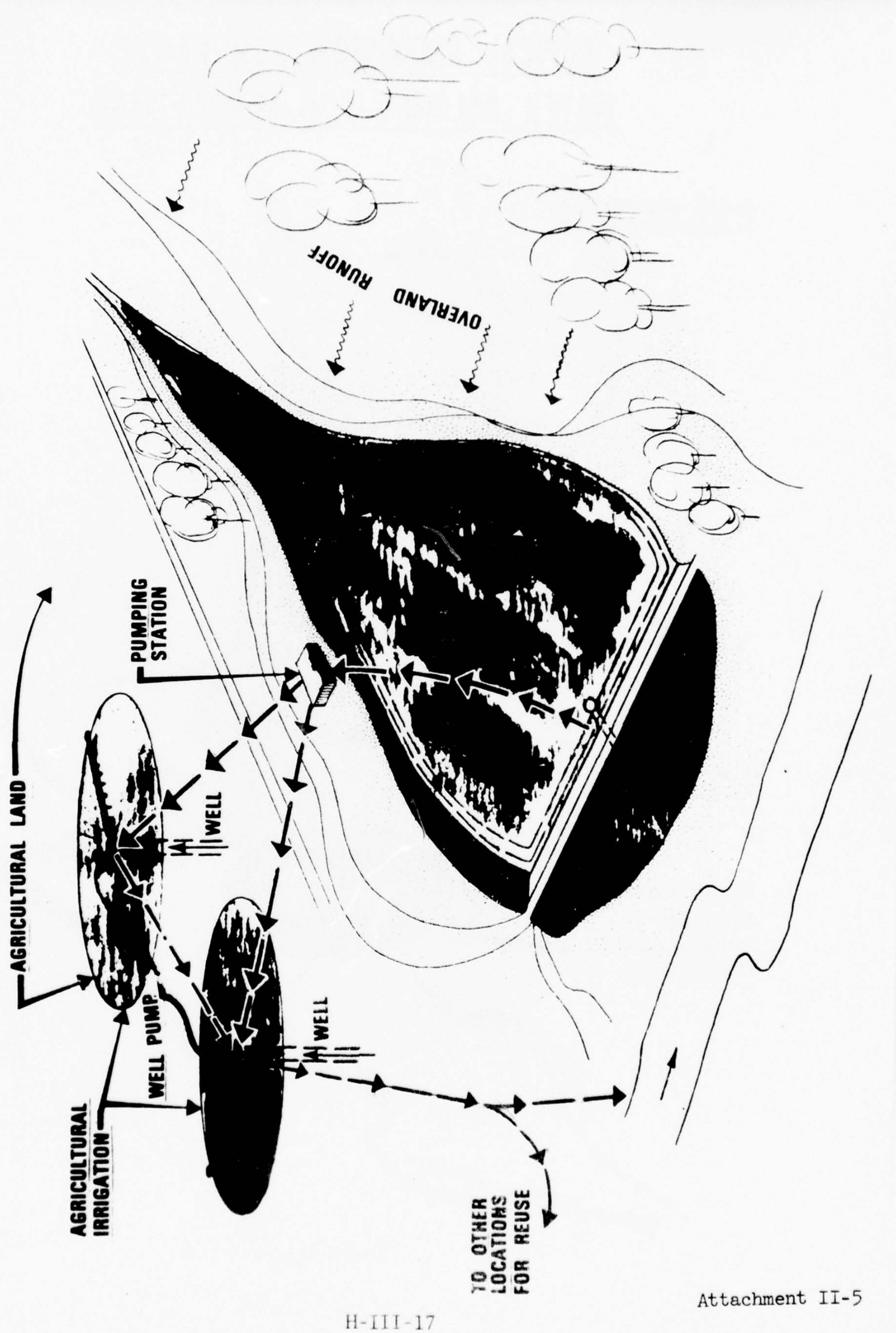
Attachment II-3

SUBURBAN STORMWATER MANAGEMENT



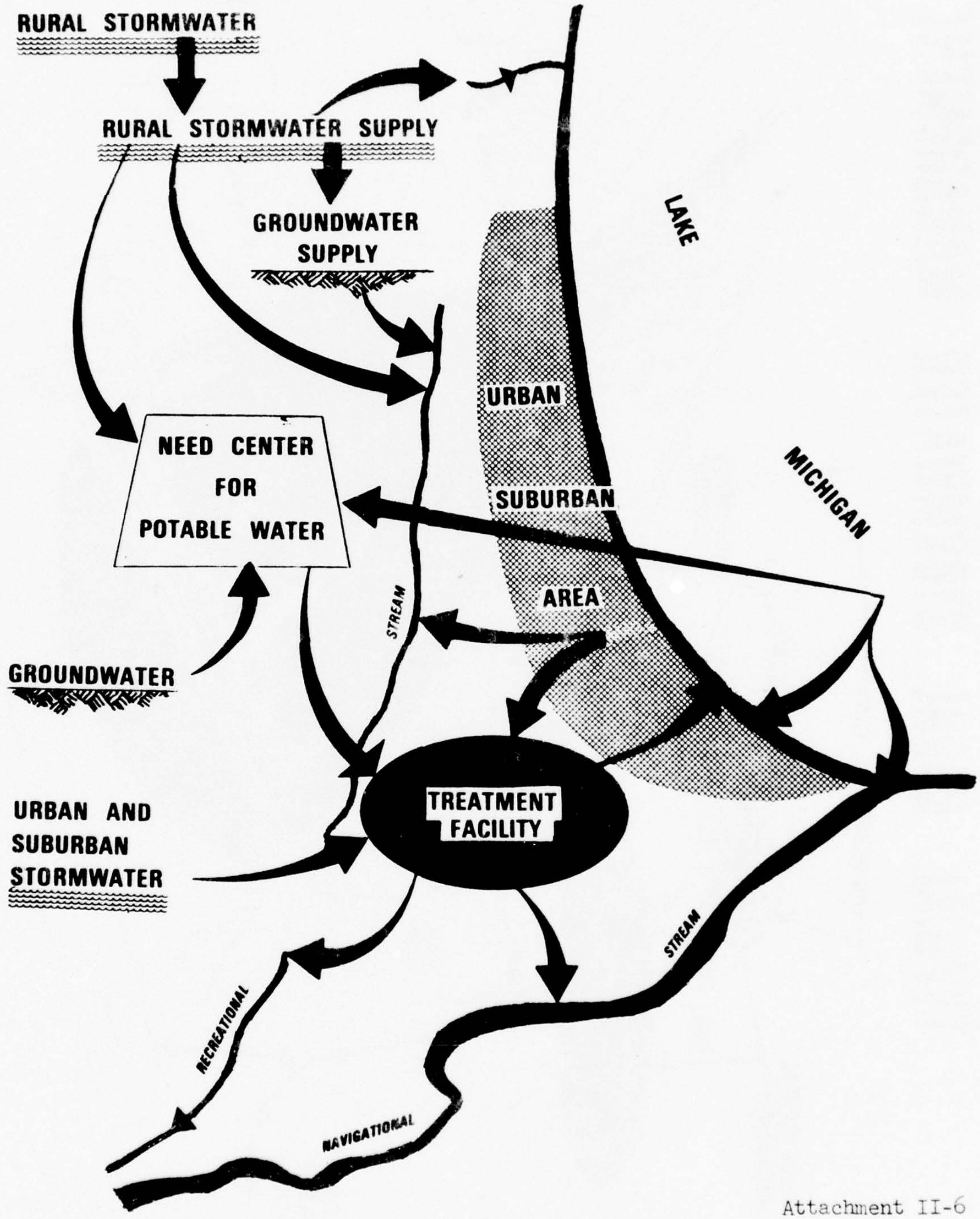
ATTACHMENT 11-4

TYPICAL RURAL STORMWATER MANAGEMENT



Attachment II-5

TYPICAL PROVISION FOR REUSE
WATER BALANCE FOR 1990 FLOWS



Attachment II-6

AIR IMPACT

- **CRITICAL AIR POLLUTANTS AT 3000 MGD**

	POLLUTANTS - TONS PER DAY		
	NO_x	SO_2	PARTICULATES
- AWT PLANTS			
ADV. BIO.	17 - 34	1	225
P-C	190 - 340	11	225
- LAND TREAT	NONE	NONE	NONE

- **ODOR**
  - AWT PLANTS - MINIMAL
  - LAND TREAT - POSSIBLE SHORT TERM IN SPRING

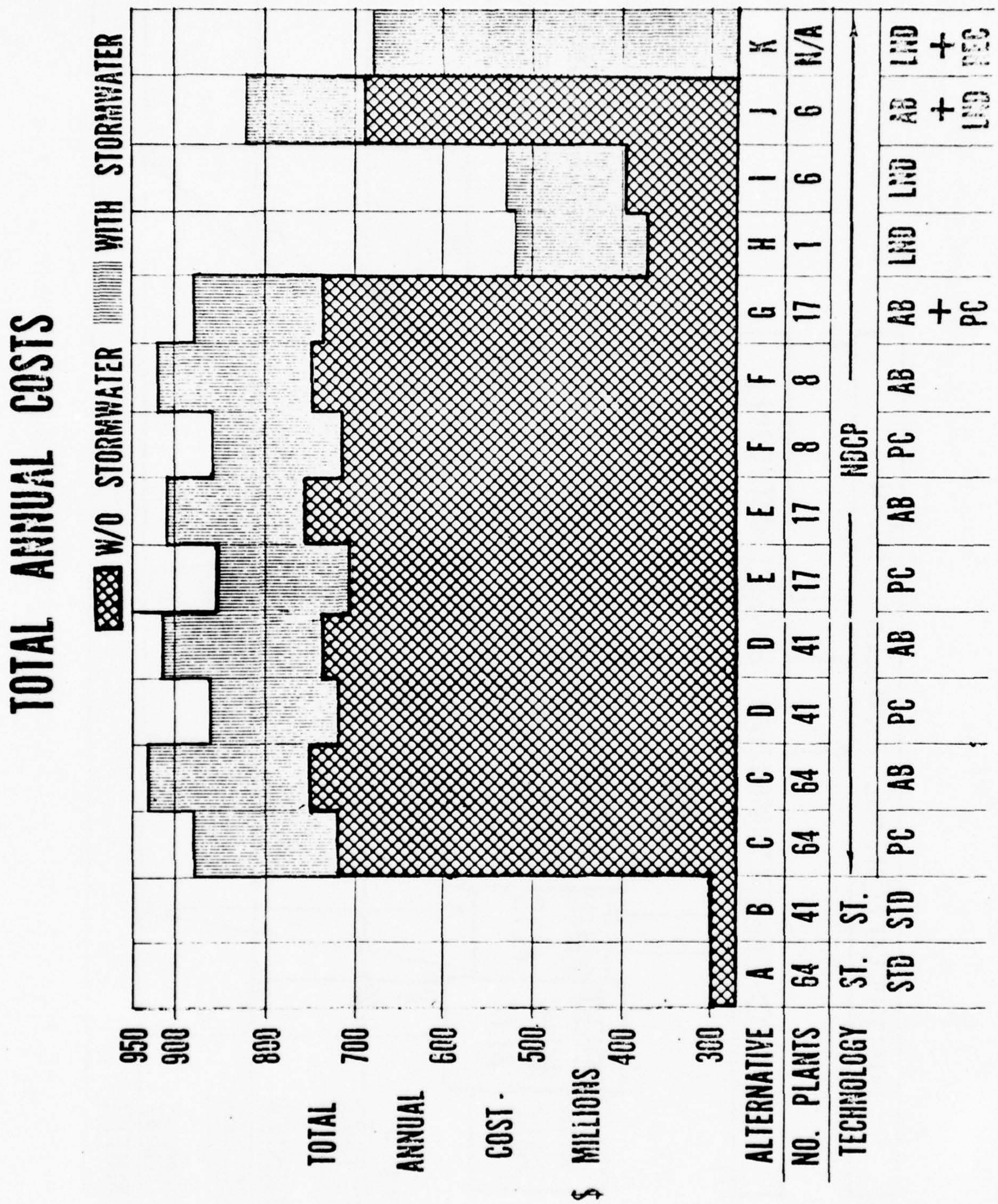
- **AEROSOL SPRAY**
  - ADV. BIO. - AERATION FACILITIES
  - LAND TREAT - AERATION LAGOON & IRRIGATION SITE

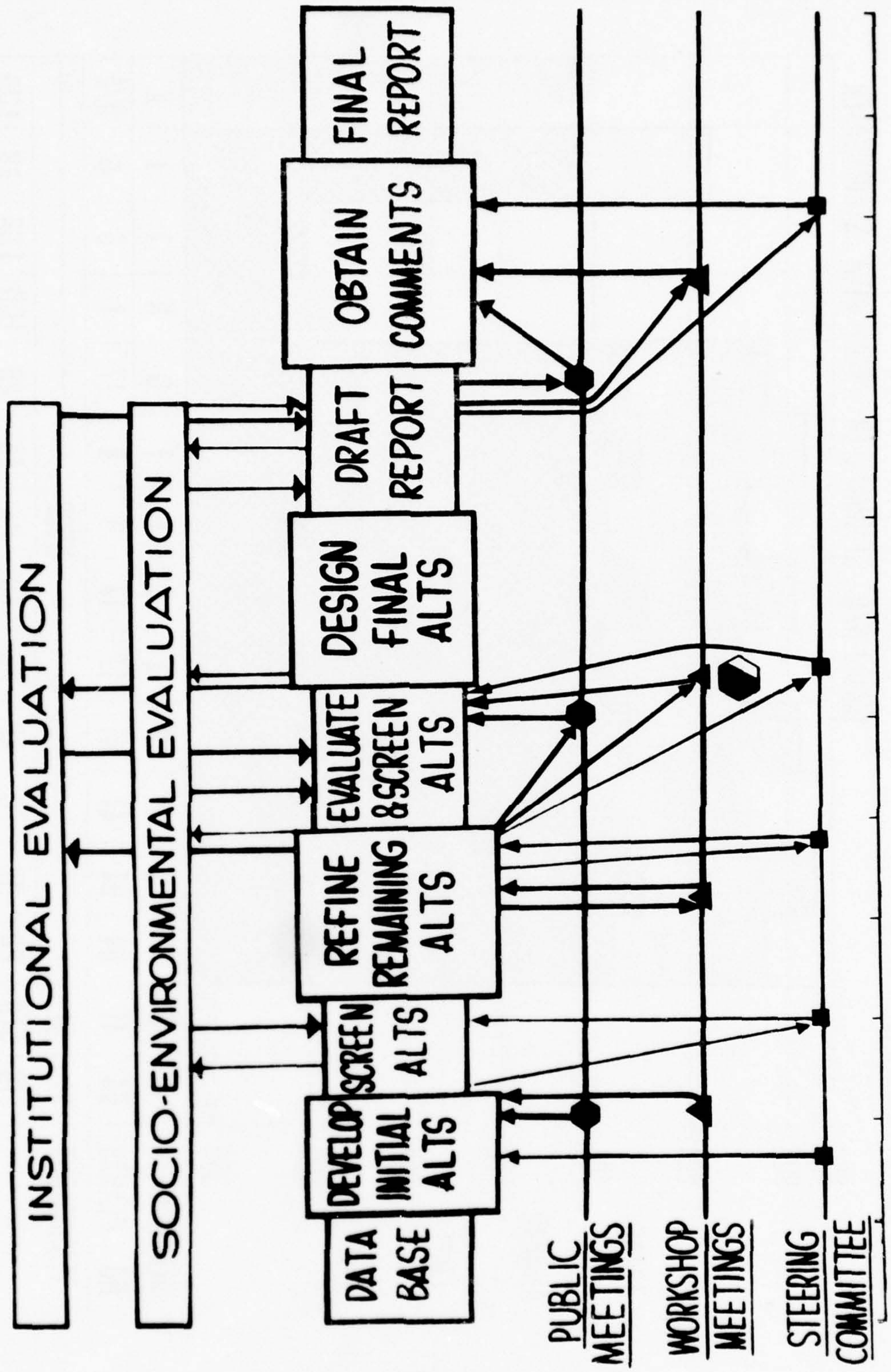
Attachment II-7

INTERMEDIATE WASTEWATER MANAGEMENT ALTERNATIVES

ALT.	EFFLUENT QUALITY		TREATMENT SITES (NUMBER & TYPE)			REMARKS
	EXIST	NDCP	BIO	P-C	LAND	
A	X		64			EXISTING REGIONAL PLANS
B	X		41			SCREENING BASE
C		X	64 OR 64			MAX. DISPERSION AWT PLANTS
D		X	41 OR 41			INT. DISPERSION AWT PLANTS - I
E		X	17 OR 17			INT. DISPERSION AWT PLANTS - II
F		X	8 OR 8			MIN. DISPERSION AWT PLANTS
G		X	5 & 12			COMBINATION AWT PLANTS
H		X			1	SINGLE LAND SITE
I		X			6	DISPERSED LAND SITES
J		X	5		6	COMBINED LAND & AWT PLANTS
K		X			6	OPEN SPACE & LAND SITES

Attachment II-8


TOTAL ANNUAL COSTS
W/O STORMWATER
WITH STORMWATER
TOTAL ANNUAL COST - $ MILLIONS
950
900
800
700
600
500
400
300
ALTERNATIVE
A B C C D D E E F F G H I J K
NO. PLANTS
64 41 64 64 41 41 17 17 8 8 17 1 6 6 N/A
TECHNOLOGY
ST. ST.
NDCP
STD STD PC AB PC AB PC AB PC AB AB + PC LND LND AB + LND LND + REC



INSTITUTIONAL EVALUATION
SOCIO-ENVIRONMENTAL EVALUATION
DATA BASE
DEVELOP INITIAL ALTS
SCREEN ALTS
REFINE REMAINING ALTS
EVALUATE & SCREEN ALTS
DESIGN FINAL ALTS
DRAFT REPORT
OBTAIN COMMENTS
FINAL REPORT
PUBLIC MEETINGS
WORKSHOP MEETINGS
STEERING COMMITTEE

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION III

STEERING COMMITTEE
(Summary - Third Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

17 August 1972

Preface

On 17 August 1972, the Steering Committee for the Chicago-South End Lake Michigan Wastewater Management study convened for the third in a series of coordination meetings. The meeting was held in the Everett M. Dirksen Building, 219 South Dearborn Street, Chicago.

The basic intent of the meeting was to provide members an introduction to four new study documents to aid members in the screening evaluations of 11 Alternatives. The four new study aspects were (1) the procedure to be utilized in assessing the socio-environmental impacts of each alternative, (2) the North Branch Chicago River Prototype study, (3) an Institutional Factors Report, and (4) Technical Progress Report Number 3. Members were provided report documents and other material related to these subjects, pursuant a reduction to the final alternatives for study.

Prior to introducing these concepts, Colonel Richard M. Wells addressed questions arising from the various advisory committees concerning documentation of the technical premises of the study. Such documentation was furnished in part to each member in three reports - "Assessment of the Effectiveness and Effects of Land Disposal Technologies of Wastewater Management" by the University of Washington; "Wastewater Management by Disposal on the Land" by the U. S. Army Engineer Cold Regions Research and Engineering Laboratory; and "Penn State Studies" by Pennsylvania State University. Colonel Wells then presented a series of questions and answers concerning the study findings and technical design considerations. Questions, answers, and disc ussion arising throughout the meeting are not summarized herein due to a malfunction of recording equipment at the meeting.

Steering Committee
17 August 1972 Attendance

Organization and Representative(s)

Mr. James O. Russell
Indiana Dept. Natural Resources

Mr. Jack W. Cormack
Greeley and Hansen for North Shore Sanitary District

Mr. Robert O. Burns
Sanitary District of Bloom Township

Mr. Ralph O. Fisher
Illinois Dept. Business and Economic Development

Mr. Arthur Horowitz
City of Chicago, Bureau of Water

Mr. Bernard D. Prola
City of Joliet

Mr. Harlan Hirt
Mr. R. Foglesong
Mr. J. W. Starr
U. S. Environmental Protection Agency

Mr. Robert P. Clarke
Illinois Environmental Protection Agency

Mr. Clint J. Keifer
Department Public Works, Chicago

Mr. Kenneth Cypra
Lake-Porter County Regional Planning and Transportation Commission

Mr. Benjamin Sosewitz
Mr. Frank Dalton
Metropolitan Sanitary District of Greater Chicago

Mr. J. E. Dunwoody
Businessmen for the Public Interest

Mr. J. A. Smedile
Northeastern Illinois Planning Commission

Organization and Representative(s) (Cont'd)

Mr. M. C. Grant
DuPage County Public Works

Mrs. Louise Rome
Illinois League of Women Voters

Mrs. D. Trump
Indiana League of Women Voters

Observers

Mr. M. R. McKenna
Commonwealth Edison rep.
Commerce & Industry Committee

Mr. Edward F. O'Malley
Brevard Engineering Co.

Mr. Edgar H. Nelson
U. S. Dept. Agriculture,
Soil Conservation Service

Corps of Engineers Personnel

Colonel Richard M. Wells
Lt. Thomas Blankenship
Mr. William Sanders

Consultant to Corps

Dr. William J. Bauer
Mr. John Lear
Mr. S. Connally Mitchell
Bauer Engineering, Inc.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION IV

CITIZENS ADVISORY COMMITTEE
CONSERVATION AND ENVIRONMENTAL INTERESTS
(Summary - Third Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

30 August 1972

PREFACE

On 30 August 1972, members of the Citizens Advisory Committee for Conservation and Environmental Interests met with U. S. Army Corps of Engineers, Chicago District, personnel for the third set in a series of meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The meeting was held at the YWCA, 37 South Wabash Avenue, Chicago.

The basic purpose of the meeting was to introduce four new study developments. These were: "Socio-Environmental Impact Methodology"; "North Branch of the Chicago River Development Plan"; "Progress Report Number 3"; and "Evaluation of Institutional, Financial and Manpower Factors". These reports were mailed to members prior to the meeting.

Before introducing these reports, Col. Richard M. Wells presented a series of issues that evolved from previous advisory committee meetings, which were discussed in more detail in a handout entitled "Technological Issues". Questions and comments of the committee, and further committee discussion on the four reports are described herein.

CITIZENS ADVISORY COMMITTEE FOR CONSERVATION AND ENVIRONMENTAL INTERESTS
30 AUGUST 1972

ORGANIZATION AND REPRESENTATIVE(S)

Mrs. Lee Botts, Committee Chairman
Lake Michigan Federation

Mrs. Helen Meier
Sand Ridge Audubon

Mr. Herbert Read
Izaak Walton League

Mr. Harry V. Bierma
Illinois Audubon Society

Mr. Richard F. Paton
DuPage Co. Region Planning Commission

Ms. Donna Schiller
League of Women Voters

Mrs. Eileen Johnston
Committee on Lake Michigan Pollution

Mr. Jack Snarr
Cook County Clean Streams Committee

Mr. Neal Bratschun
Lyons Twps. H. S. Conservation Club

Mr. Ralph C. Frese
North Branch Coalition

Mr. Steven Bellew
Sierra Club

Ms. Jo Ann Horowitz
American Association of University Women - Illinois Division

Ms. Janet Malone
Council on Population and Environmental

Corps of Engineers Personnel

Col. Richard M. Wells
Lt. Thomas Blankenship
Mr. James Maas
Mr. Mike Ryan

Consultant to Corps

Dr. Donald E. Matschke
Bauer Engineering, Inc.

COMMENTS ON TECHNOLOGICAL ISSUES

Committee Member: There is concern with the NDCP standards and the 0.6 mg/l/year buildup of dissolved solids, as proposed under the NDCP alternatives.

A: There is a natural buildup of dissolved solids even without returning the effluent to the lake. The long range buildup of 0.6 mg/l/year is well below the threshold level at which point the salt concentration would begin to cause harmful effects on the aquatic environment. The technology exists to remove these salts (at some monetary expenditures, of course) but the problem of disposal of the salts would remain.

Committee Member: Consideration should be given to phosphorous removal from sewage.

Committee Member: Environmentalists should encourage adoption of the NDCP standards as defined by the Crops, ie., as a standard above existing standards but not requiring an absolute zero discharge of pollutants.

Committee Member: The land system studies cited by the Corps for comparison and data support differ from the proposed land treatment system; hence the data is inadequate for use in the "expected performance forecast."

A: Even though some prior systems may differ from the proposed system, they are useful in indicating the types of considerations of interest to the study and are additionally valuable in providing information on system elements that may be common amongst systems.

Committee Member: Greater emphasis should be placed on the reduction in the amount of water required to carry waste.

A: The amount of recycling to accomplish such a reduction is restricted by, for example, economics and technology. In fact, the Corps has been criticized for too great a reduction in the industrial load by interpolating current industrial recycling efforts too optimistically. Note also that stormwater is not recycled, and this flow greatly increases the amount of wastewater to be treated.

COMMENTS ON PRESENTATION AND OTHER COMMITTEE BUSINESS

Committee Member: It is necessary to have phosphorus in the effluent for the land treatment-crop irrigation system.

A: Residual phosphorus in the effluent is not used totally by the crops in the land treatment system. The soil captures the surflus phosphorus and should be able to continue holding this surplus for at least 100 years.

Committee Member: How will the rural stormwater runoff be handled?

A: Rural stormwater will be treated in the rural areas. The treated water will then be utilized as supply for various water needs in the C-SELM area.

Committee Member: Additional erosion control practices should be incorporated in the rural stormwater management plan to reduce the pollutant effect of rural stormwater runoff.

Committee Member: Rural runoff is a significant source of pollution containing herbicides, oils, etc. Fertilizer use should be controlled.

Committee Member: Building dams as part of the rural stormwater management scheme would perpetuate the tendency to build in the flood plain and then use dikes to combat flooding. This is an unwise use of the floodplain.

A: The North Branch Chicago River prototype plan is concerned basically with floodplain management and addresses this type of concern.

Committee Member: Is there a time schedule for phasing the treatment of storm and combined flows?

A: Yes, this would be accomplished about 1980 if the plan was implemented as soon as possible.

Committee Member: Will Jack Shaeffer's association with the technical consultant, Bauer Engineering, Inc., bias the study towards a land system?

A: No, the Corps is not committeed to any particular treatment method.

Committee Member: How large will the deep pit storage areas be?

A: Storage is provided by surface ponds or deep pits, depending on the amount and location of available land. Surface ponds would provide storage in most suburban areas and in rural areas which are expected to develop during the study period. Since topography in these areas is generally restricted to shallow ponds, the width will be 200-300 feet, the length 200-400 feet, and the minimum pool depth from 5 to 10 feet.

Pit storage is used in presently urbanized areas only where sites are limited and combined sewage would be stored. Pits could be from 200 to 400 feet deep.

Committee Member: How is the information obtained from the advisory committee utilized in the screening process?

A: An attempt has been made to outline the planning process by presenting the policy considerations that impact on the screening process. By obtaining the reactions of each advisory committee to these policy considerations, the District Engineer can consider each committee's position both individually and collectively prior to making the final decision on which alternatives should remain.

The advisory committee comments will also be used as a catalyst for discussion in the public meetings.

Committee Member: What will be the result of completion of the study?

A: A draft report will be presented to all committees and the public for review. The comments pursuant this review will be incorporated in the final report which will be forwarded to Congress.

Committee Member: Mrs. Botts suggested that members with questions (occurring after the meeting) should refer them to her to get the answers. By asking and having questions answered, members would be better able to react to the proposed alternatives.

Committee Member: How will oils be removed?

A: Oils are biologically degradable in the rural management ponds and are also removed by the soil system.

Committee Member: Is more detailed information available on the location of improvements identified in the North Branch study, and are particular sites proposed for purchase and development?

A: No, this is not available at present. However, the prototype will be refined and applied in more detail.

The meeting was adjouned with no further questions.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION V

CITIZENS ADVISORY COMMITTEE
COMMERCE AND INDUSTRY
(Summary - Third Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

16 August 1972

PREFACE

On 16 August 1972, members of the Commerce and Industry Committee met with the U. S. Army Corps of Engineers, Chicago District personnel for the third set in a series of citizens advisory committee meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The meeting was held in the Everett M. Dirksen Building, 219 South Dearborn Street, Chicago.

The basic purpose of the meeting was to introduce four new study items. These were (1) The procedure to be used in assessing the socio-environmental impacts of each alternative, (2) The North Branch, Chicago River Prototype study, (3) an institutional factors report, and (4) technical progress report No. 3. (Written material on each of these items, except for item 3 which was forwarded later, was distributed at the meeting.) This information was provided as initial input for ultimately screening and reducing the alternatives to a more manageable number.

Prior to discussing these items, Col. Richard M. Wells furnished three reports concerning the land technology (process) to the Committee Chairman, Mr. Clarence W. Klassen. The three reports were "Assessment of The Effectiveness and Effects of Land Disposal Methodologies of Wastewater Management" by the University of Washington; "Wastewater Management by Disposal on the Land" by the U. S. Army Engineer Cold Regions Research and Engineering Laboratory, and "Penn State Studies" by Pennsylvania State University. Col. Wells then presented a series of questions and answers concerning the study findings and technical design considerations.

Section I summarizes this presentation. The ensuing discussion which followed is also summarized. Answers to the questions of the committee members were provided by Col. Wells., with the assistance of Dr. William Bauer, of Bauer Engineering, Inc., technical study consultant to the Chicago District. The four referenced documents are summarized in Section II together with the questions and comments that evolved.

CITIZENS ADVISORY COMMITTEE FOR
COMMERCE AND INDUSTRY
16 AUGUST 1972 ATTENDANCE

ORGANIZATION AND REPRESENTATIVE (S)

Mr. Edward C. Logelin
United States Steel Corp.

Mr. Clarence W. Klassen
Committee Chairman
MidWest Coal Producers

Mr. C. W. Kern
Northern Indiana Public Service Co.

Mr. George E. Dirkes
Illinois Assn. of Aggregate Producers

Mr. K. G. Murlock
Union Carbide Corp.

Mr. Fred. P. Cairo
Northern Illinois Gas

Mr. M. R. McKenna
Commonwealth Edison

Mr. S. Matthew Horan
Urban Investment & Development Co.

Mr. Mark R. Stumpf
Abbott Laboratories

Mr. C. F. Meulder
Burlington Northern RR

Mr. T. L. Reid
Illinois Manufactures Association

Mr. R. H. Barnett
P & W. Engineers, Inc.

Mr. Gerald L. Spaeth
Calumet Area Industrial Development Commission

Mr. Thomas R. Kinney
Interlake, Inc.

Mr. Paul A. Loop
L. B. Knight & Associates

Mr. Louis Bulger
Sargent & Lundy

Mr. John Page
Morton Salt

Mr. H. S. Backus
G. D. Searle & Co.

Consultant to Corps
Illinois Central & Gulf R. R.

Mr. John L. Engler
Atchison, Topeka & Santa Fe RR Co.

Mr. Vernon E. Swanson
Real Estate Research Corp.

Corps of Engineers Personnel

Col. Richard M. Wells
Major, Leroy R. Hayden
Lt. Thomas Blankenship
Mr. Carl. W. Hessel
Mr. William H. Sanders, III
Mr. Mylo Ryan

Consultant to Corps

Dr. William Bauer
Mr. S. Connally Mitchell

Observer

Mrs. Lee Botts, Chairman
Citizens Advisory Committee
for Conservation & Environmental Interests

COMMITTEE DISCUSSION ON TECHNOLOGICAL ISSUES

Committee Member: Treatment plants that employ air stripping release ammonia into the atmosphere where it is absorbed, only to precipitate down later as rain and enter the water supply. Where is the enviornmental gain?

A: Injection of ammonia to the air is indeed foolish, since it is bound to precipate back down. The way to remove nitorgen is to capture it, as the C-SELM land, advanced biological, and advanced physical chemical technologies will do.

Committee Member: Raising cattle on land onto which secondary effluent is sprayed would subject the cattle to diseases if the cattle feed on the land. Such cases have been documented, although controls could be implemented.

A: Bauer Engineering, Inc. (BEI) the technical consultant, has considered the question of cattle diseases. Personnel have visited a farm in Melbourne, Australia, where cattle feed on crops grown with sewage. The cattle are subjected to the same inspection process as other meat overseas. The result has been a lower rejection rate for the Melbourne cattle than cattle raised elsewhere in the country.

Committee Member: Over periods of time, there are other factors involved in the development of diseases. For example, cattle raised at the Melbourne site are able to build immunity in the strain against sewage related diseases. The Crops plan is to import cattle.

A: One of the reasons for chlorination of the secondary effluent is to destroy disease carrying organisms prior to spray irrigation.

Committee Member: In some instances grass, such as Reed Canary Grass, absorbs heavy metals. If this is the case for Chicago sewage than the grass could not be used as feed.

A: Regardless of the technology employed (P-C, advanced biological, land), most of the heavy metals will be in the sludge. BEI has been transporting MSD sludge by train to a farm in Southern Illinois for land application. Crops grown at the farm are analyzed, and the ground water is monitored should a heavy metals problem develop. Even though the heavy metals are present, they are sufficiently entraped by the organics in the sludge that they do not hinder the crop. Proof of this can also be found in the Shawnee National Forest project. The organics chelate not only the heavy metals in the sludge, but also metals present in problem soils, rendering the metals inactive.

A paper was recently written by a German researcher who experimented with potted plants to see how they would tolerate heavy metals. By applying soluble cadmium he produced a toxic condition. He then applied sludge, also containing cadmium, to the plants, and found that he could reverse the current plant problem (toxicity) by adding sludge.

So far, there have been no noticeable effects on productivity of crops at the MSD site when application rates of 150 dry tons of sludge/acre or less were used. The reason for this lack of difference in productivity, aside from the soluble nitrogen in the sludge, is that available nitrogen is taken up by plants, lost to the air, and used by microorganisms in the soil. The remaining organic nitrogen then becomes stabilized and is available for use by the plants.

Committee Member: The results and data from the Muskegon plant should not be extrapolated for the C-SELM study area since the soil conditions are different (i.e., the sand dunes in Muskegon). Do you feel that the application rate in Muskegan can be applicable to northern Indiana?

A: Certainly the waste load and the chemical properties of the soil are different and hence must be taken into account. In order to take the Muskegan results and apply it to this study, we must look at each characteristic of the results and then supplement it by laboratory and field tests.

Committee Member: What about the salt buildup in the lake? The salt buildup in the Lake is regulated by the four states surrounding Lake Michigan and the Environmental Protection Agency, as well as the City of Chicago which has set an extremely low limit on salt concentration in effluent discharge.

A: Salt buildup in the lake is estimated at 0.6 mg/l/yr. During the 50 years of the C-SELM project, this would produce a buildup of 30 mg/l. This long-range buildup is well below the threshold level at which point the salt concentration would begin to cause harmful effects on the aquatic environment. An important consideration, however, is that we have been loosing as a resource the intermittent stormwater flows that not only cause trouble downstream, but is also subtracted from the 3,200 cfs diversion limitation. The proposed system would make good use of this water, hence there must be some way to store it, for example over a period of wet years for periods of dry years. The only reservoir capable of storing large quantities of water for a period of years is Lake Michigan.

Committee Member: Dr. Lane of the 3M Company has testified before Congress on the question of a zero discharge level. Dr. Lane questioned not only the economic feasibility, but also the environmental impact. An article that appeared recently in the Wall Street Journal told of his investigation of a 3M plant. Since zero discharge was not defined, he assumed it to be, for the purpose of his investigation, the drinking water quality set by the U. S. Public Health Service. He then calculated the environmental impact of achieving this standard for the 3M plant. He found that the plant would have to remove about 4000 tons/year of pollutants, but to do so would require 40,000 tons/year of natural resources while injecting some 19,000 tons/year of pollutants into the environment. These ideas of Dr. Lang, which he termed a "negative natural impact, are very valid for this committee.

A: Some of these environmental impacts are estimated in the latest progress report. We calculated the electric and natural gas energy consumption for the present and proposed alternative systems, and identified the tons of chemicals required by each of the three technologies. This was done to identify some of the negative impacts. The air impact was estimated by the pollutants that would escape to the atmosphere, ie., sulfur dioxide, oxides of nitrogen, and particulate matter. It is apparent in comparing these impacts that the land technology is well in the lead.

However, there are other considerations, for example the incremental photosynthesis of the land system that removes carbon dioxide while generating oxygen. The oxygen production aside, consider the incremental heat absorbtion from the sun resulting from the closed synthetic process that is the equivalent of 13,000 megawatts of electric power. The total energy consumption of the land system is about 1,000 megawatts, so that the system absorbs thirteen times as much energy from the sun as it requires for the process. Although we can sometimes make matters worst, we must also take such considerations as these into account.

FURTHER COMMENTS AND COMMITTEE BUSINESS

Committee Member: One advantage for the land system has been overlooked, especially in view of the noise pollution regulations industry is faced with. The land system does not require a great amount of technical equipment and hence should be a quieter operation.

Committee Member: Why was the Lake-Porter County Regional Planning and Transportation Commission involved in the North Branch Chicago River Resource Development Plan?

A: Since the North Branch Plan is a prototype to be extended to streams in Indiana as well as Illinois the Commission would want to insure that we have a viable prototype.

Committee Member: The Shawnee National Forest site has been dropped and Fulton and Knox sites retained. Is further consideration of other coal mining areas to be dropped?

A: No, other areas have not been dropped; however, we will attempt to utilize the areas closesst to the study area having enough area to handle the total load.

Committee Member: Why were the Will-Grundy and Southern Illinois sites eliminated?

A: These sites are considerably more expensive than other options, and the trend is to utilize the least expensive options. Also, for the system that included application of sludge at Shawnee National Forest, the negative impact caused by incineration of sludges at the treatment plants did not compensate for benefits to the land at Shawnee.

Chairman Clarence Klassen conducted a brief session for committee business. During the course of the session Mrs. Botts, an observor at the meeting and chairman of the Citizens Advisory Committee for Conservation and Environmental Interests, suggested a joint meeting of the committees to exchange views. Upon agreement of Chairman Klassen and the committee, a meeting between representatives of both committees was tentatively set for 1 September 1972 and the meeting was adjourned.

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION VI

CITIZENS ADVISORY COMMITTEE
LOCAL PLANNING ORGANIZATIONS AND SANTIARY DISTRICTS
(Summary - Third Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

H-III-1-43

18 August 1972

Preface

On 18 August 1972, members of the Local Planning Organizations and Sanitary Districts Advisory Committee met with U. S. Army Corps of Engineers, Chicago District personnel for the third set in a series of citizens' advisory committee meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The meeting was held in the Everett M. Dirksen Building, 219 South Dearborn Street, Chicago.

The basic purpose of this meeting was to introduce four new study items. These were (1) The procedure to be used in assessing the socio-environmental impacts of each alternative, (2) The North Branch Chicago River Prototype study, (3) An Institutional Factors Report, and (4) Technical Progress Report No. 3. (Written material for each of these items, except for item 3 which was forwarded later, was distributed at the meeting). Introduction of these items were pursuant the final screening (reduction) of alternatives to be begun at the following meeting, subsequent to Committee review of the four documents.

Prior to introducing the reports Colonel Wells alluded to questions arising from the various committees concerning documentation of technical premises of the study. Such documentation was provided the Committee Co-Chairmen, Mssrs. F. Leonard Coventry and John Harvat, in three reports - "Assessment of the Effectiveness and Effects of Land Disposal Technologies on Wastewater Management" by the University of Washington; "Wastewater Management by Disposal on the Land" by the U. S. Army Engineer Cold Regions Research and Engineering Laboratory; and "Penn State Studies" by Pennsylvania State University. Colonel Wells presented a series of questions and answers concerning the study findings and technical design considerations. Questions and comments that evolved during committee discussion are presented herein

Citizens Advisory Committee For
Local Planning Organizations and Sanitary Districts
18 August 1972 Attendance

Organizations and Representative(s)

Mr. F. Leonard Coventry
Gary Sanitary District

Mr. Thomas J. Pappas
Board of Public Works, Valparaiso

Mr. E. M. Maiden
Mrs. Virginia Alexander
Lake County Regional Planning Commission

Mr. Ben J. McEwan
Downers Grove Sanitary District

Mr. James B. Gifford
Michigan City Sanitary District

Mr. R. F. Schlegel
Cook County Council of Governments

Mr. Lester L. Warning
Public Works Department, Homewood

Mr. D. Eddy
Hinsdale Sanitary District

Mr. Charles Allen
Department of Planning, Gary

Corps of Engineers Personnel

Colonel Richard M. Wells
Major Leroy R. Hayden
Lt. Thomas Blankenship
Mr. Carl Hessel
Mr. W. Henry Sanders, III

Consultants to Corps

Mr. Wayne A. Cowlishaw
Mr. S. Connally Mitchell
Bauer Engineering, Inc.

Observer

Mr. George Benda, Representative
Advisory Committee For Conservation
of Environmental Interests

COMMENTS ON PRESENTATION AND OTHER COMMITTEE BUSINESS

Subsequent to Colonel Wells' presentation, a brief discussion insued that is summarized below. It was decided to meet again to continue the discussion to provide members time to review the documents that Colonel Wells presented. Members also decided to hold a meeting in Illinois and a similar one in Indiana to discuss the reports prior to the next regularly scheduled meeting on 13 September, at which time the committee would continue to express its concerns and questions. The discussion relative to the presentation follow.

Committee Member: Alternative G puts the Valparaiso and the Michigan City plants out of business.

A: The study is concerned with a very broad regional scope. If a pure land system is chosen as the desirable system, then all treatment plants will be eliminated. Of course, the only reason that this would happen is if the land system could perform the job more efficiently and more economically than the present trend to treatment plants. On the other hand, under the existing standards all plants will be retained.

One fact that should emerge from the detailed institutional evaluation report is that greater employment opportunities, rather than less, should exist under the proposed higher standards that require a greater committment of manpower.

Committee Member: The Four States Conference will convene on September 18 and may last several days. One of the items on the agenda is another look at water quality standards. As operators in the field this leaves us in doubt as to which standards to plan for.

A: The NDCP standards in the study are those included in legislation currently under consideration by Congress.

Committee Member: Is the cost of handling existing facilities included in the cost analysis comparison?

A: Yes, the cost of improvements to, as well as the operation and maintenance costs for existing facilities are included.

Committee Member: Have soil samples been taken in the proposed areas of land application?

A: Samples have been taken, for example, in the Kankakee River basin to determine the type of soils there, but we have not performed a detailed analysis of the soils at the various sites. However, the type of detail presented on soils is consistent with the level of analysis of the report.

Committee Member: Some members of the committee should have extensive knowledge of the soils, especially in their area, and it might prove fruitful for them to review soil data presented in the study.

A: One way to accomplish such a review is to hold a meeting of those with technical expertise on the committee. Several of these types of meetings have been held for the other committees to discuss source documents, etc.

Committee Member: Does the study analysis include the types of considerations such as chloride buildup, etc? Such buildup is a significant problem for the land treatment system at the Imperial Valley.

A: The effluent is chlorinated prior to holding in lagoons. While in the lagoons the effluent undergoes dechlorination prior to land application.

Salt buildup in the Imperial Valley results from two factors. First, it is an arrid area. Secondly, the system is not underdrained as is the proposed C-SLM system. The C-SLM system would hence leach a salt buildup that could occur down to underdrains and thus remove the salts.

The committee can decide if a meeting is warranted to discuss these types of items and inform us.

The meeting was adjourned with no further comments.

STAGE III - PART 2
TECHNOLOGICAL ISSUES

GENERAL

1. Is "No Discharge of Critical Pollutants" (NDCP) standard too strict?

Answer: Congress requested the Corps to evaluate a criteria of "No Pollutant Discharge". After studying that mandate, existing technology and the literature available, and consulting appropriate agencies, a rationale was developed for the present NDCP criteria. That rationale is in the attached Appendix.

2. Document the capabilities of the system technologies.

Answer: The capabilities of the three technologies are documented in inclosure 3 to the Appendix. The best, most recent information available served as the basis for these capabilities. One should recognize that NONE of these three systems (advanced biological, physical-chemical or land) have been operated and rigorously tested in a large scale facility.

3. If treated water is returned to Lake Michigan, will the salt (dissolved solids) build-up harm the lake?

Answer: A crude, very conservative estimate of the salt build-up indicates that the increase would be less than 0.6 mg/l per year. P II-7 of Progress Report #3, August 1972 expands on this subject.

4. Should stream bottom sludge deposits be removed?

Answer: We believe not until after the discharges themselves are meeting standards and there is some evidence to show the need for the removal. Some studies indicate that the sludge deposits will become "inactive" over a period of a few years; thus they will not degrade water quality. A similar conclusion was reached by Dr. C. Sawyer as a consultant to MSDGC.

Certain deposits in areas such as the Skokie lagoons will likely require priority consideration if they are to once again realize their recreation potential.

5. Are predictions of Industrial waste reduction by recycling too optimistic?

Answer: The values presently being used have been extrapolated from existing examples of what the primary water users (steel and petroleum industry) have already done at some facilities. To confirm or refine this data, we are working with those two industries to obtain their respective opinions as to the feasibility of large scale recycling.

6. Is it possible to frame alternatives with intermediate effluent quality goals lying between the existing and NDCP standards?

Answer: Yes, however, such goals are not consistent with the goals of the C-SELM study which are to evaluate alternatives which achieve natural background water quality levels and to utilize this renovated water effectively.

LAND TREATMENT

7. Will land treatment storage lagoons produce odors in the spring?

Answer: It is possible there will be some odor for about one week associated with "spring turnover" if stratification occurs. It is not certain, however, that stratification will occur in the 15 to 20 foot deep storage lagoons inasmuch as stratification is usually not encountered in lagoons of less than 30 foot depth.

8. Will land treatment storage lagoons grow algae that will interfere with irrigation?

Answer: It is expected that there will be algae growing in the storage lagoons. It is not anticipated that these algae will interfere with the irrigation either with respect to mechanical equipment operation or performance of the living filter. As an example of the conservative design with respect to application rate to the living filter, a sand filter system designed for filtering silt and algae laden river or lake water would operate at application rates of perhaps 0.1 to 1.0 GPM/ft.^{2}. By contrast the living filter system in the C-SELM design is designed for application rates of 0.00025 GPM/ft.^{2}.

9. Will land treatment lagoons require more power to operate than has been estimated?

Answer: Current estimates are based on eight horsepower per million gallons. This is based on the design for the Muskegon system. The technique involves a combination of mixers and aerators that together provide sufficient mixing and aeration energy to maintain a complete mixed, aerobic lagoon. The energy requirements are less than otherwise might be expected in an aerobic lagoons because 1) the BOD demand is less than is often encountered in large lagoon applications where high BOD industrial wastes are involved and 2) the mixers are more efficient users of electrical energy than are the normally encountered aeration units.

10. Will wastewater become septic during conveyance to the land treatment site?

Answer: The tunnel slopes are steep to maintain a velocity of 7 feet per second. This combined with the equivalent 1100 feet of lift applied by pumps along the route should aerate the wastewater. There are examples in the Chicago area of long distance flow which does not become septic. The maximum transit time is estimated to be 24 hours.

11. Pilot plant operation of the land treatment system should begin immediately.

Answer: The Muskegon, Michigan project, a joint local, State and Federal EPA project will be in operation this year. It should provide considerable, relatable date for the C-SELM area, but not for this study which will be completed before results are available. Listed below are some sites in the world where the technique is practiced.

REPRESENTATIVE LAND DISPOSAL OPERATIONS

Location	Mode of Application	Type of Waste
Penn State College State College, Pa.	Spray Irrigation	Domestic
Campbell Soup Co. Paris, Tex.	Overland runoff	Cannery
Muskegon, Mich. (under construction)	Spray irrigation	Municipal
Flushing Meadows Project Phoenix, Ariz.	Rapid infiltration	Municipal
Santee, Calif.	Rapid infiltration	Domestic
Whittier Narrows Los Angeles, Calif.	Rapid infiltration	Municipal
South Lake Tahoe, Calif.	Overland runoff	Domestic
North Lake Tahoe, Calif.	Rapid infiltration	Domestic
Celotex Corporation L'Anse, Mich.	Spray irrigation	Industrial (insulation board)
Seabrook Farms Seabrook, N.J.	Rapid infiltration	Frozen vegetable
Westby, Wis.	Ridge & Furrow spreading	Municipal
Sunkist Growers, Inc. Corona, Calif.	Ridge & Furrow spreading	Lemon processing
Campbell Soup Co. Napoleon, Ohio	Overland runoff	Cannery (tomato)

REPRESENTATIVE LAND DISPOSAL OPERATIONS (cont'd)

Location	Mode of Application	Type of Waste
Campbell Soup Co. Chestertown, Md.	Overland runoff	Cannery (poultry)
Howard Paper Mills Urbana, Ohio	Spray irrigation	Industrial (paper)
Sunapee State Park Mt. Sunapee, N.H.	Spray irrigation	Domestic
Beardmore and Company Toronto, Ontario Canada	Spray irrigation	Industrial (tannery)
Shoemaker's Dairies Bridgeton, N.J.	Spray irrigation	Industrial (milk processing)
Comercial Solvents Corp Terre Haute, Ind.	Spray irrigation	Industrial (fermentation)
H. J. Heinz Co. Salem, N.J.	Spray irrigation	Cannery (tomato)
Riegel Paper Co. Hughesville, N.J.	Spray irrigation	Industrial (paper)
Green Valley Farms Avondale, Pa.	Spray irrigation	Cattle wastes
Masonite Corps. Towanda, Pa.	Spray irrigation	Industrial (wall board)
Sewage Farm Werribee, Australia	Overland runoff	Municipal
Tallahassee, Florida	Spray irrigation	Municipal

We are collecting data from some of these areas. This data should be available before the study is complete or final comments are required.

It is almost certain that a land treatment alternative that might be included in the final array of alternatives would involve a phasing-in period which could serve as a final pilot plant operation.

12. Is reed canary grass unpalatable to cattle?

Answer: We have not settled on an array of cross for the land treatment system. The range of possibilities in management techniques or the degree of operator interest in the land itself (title, lease, ease-back, etc.) and therefore the control over the crops produced which might be acquired by any operating agency is varied. Individual farmers live on the farm in Australia; and, if this same practice were followed here, it could result in a fair diversity in crops.

Reed canary grass has some advantages in that it requires little maintenance and that which is required is not hindered by recent wastewater applications. If the grass were used, it would be necessary to pelletize and export the pellets; in this form it would be palatable.

13. Will the land treatment system achieve effective removal of nitrogen compounds? How does the application rates of nitrogen compounds to the land compare with current practices? Will the high ammonia nitrogen content kill germinating seeds?

Answer: Nitrogen compounds associated with secondary treated wastewater are removed by a variety of mechanisms in the land system. Ammonia nitrogen is temporily captured by an ion exchange mechanism referred to as the soil cation exchange capacity. The ammonia nitrogen is attacked by nitrifying micro-organisms and converted into nitrite nitrogen and subsequently converted into nitrate nitrogen. The nitrate nitrogen, which is free and mobile, is capable of (1) being assimilated by the growing crops, (2) being used by microorganisms, (3) travel to the groundwater, or (4) escape to the air from the nitrogen cycle in a volatile condition. The portion which migrates downward through the soil to the groundwater table may encounter denitrifying bacteria. These bacteria will reduce part of the nitrate nitrogents to nitrogen gas. The remainder of the unreduced nitrate nitrogen will be lost to the groundwater. Evidence in agricultural literature demonstrate nitrogen applications in practical balance with crop uptake in an underdrain effluent water with 2 milligrams per liter of nitrate nitrogen.

The rates of application practiced at Pennsylvania State University experimental plots also yielded nitrogen concentration within the design limits being used in the C-SELM study.

Nitrogen compounds contained in wastewater are a valuable source of nutrient for plants. By good management practices and by designing application rates consistent with crop uptake it is possible to use the nitrogen to grow crops plus produce an effluent which meets the high quality goal. The C-SELM design application rate is approximately 300 pounds of nitrogen per acre per year. It has been reported that current practice for application of animal wastes as fertilizers use up to 400 pounds of nitrogen per acre per year.

It is not anticipated that the ammonia concentrations associated with typical secondary effluents (15-20 mg/1) will have a debilitating effect on seed germination. The agricultural considerations of the Cold Regions Research and Engineering Laboratory (CRREL) and the University of Washington reports did not identify any such problems. Further attention will be given to this item.

APPENDIX

PROGRAM TECHNICAL GOALS

In the comparatively brief history of broad based concern over pollution of water resources a continual evolution has taken place. Water quality standards have become the prime tools to restore the quality of the aquatic environment.

The earlier foward looking standards, condemned by many at the time of their "imposition" as unwarranted and unreasonably stringent, turned out to be intolerably permissive. The past uproar over the requirement of "Secondary Treatment" of all sewage not only subsided, but secondary treatment became the minimum acceptable level of treatment to meet today's existing water quality standards in most states of the union.

All "standards" are to an extent arbitrary in that they have a general validity for enforcement over a specific area yet they would not necessarily be "needed" at some points and locations. Existing "standards" are established in two distinct categories: (1) Stream water quality standards, and (2) Effluent standards. The State of Illinois has both kinds of standards. The State of Indiana has only stream water quality standards but uses a certification procedure to control effluent discharges and also special wastewater treatment requirements for specific locations.

Program Technical Goals. The program technical goals for the Corps' C-SELM study are forward looking, and are summed up in the simple phase of "No Discharge of Critical Pollutants". These technical goals are the goals now pending in the U. S. Congress.

The purpose of these "Technical Goals" is to prevent the continued degradation of our water resources by waterborne wastes and to provide for the efficient reuse of treated or renovated wastewater and its separated constituents.

Achievement requires a standard geared to "maximum reasonable purity" of sewage effluent and urban stormwater runoff. In effect this is a standard of "No Discharge of Critical Pollutants." For the first time, through establishment of such goal, the social as well as financial cost of achieving high water quality on a regional scale, will be defined.

The Chief of Engineers, at the national level, established criteria for the No Discharge of Critical Pollutants standards. A discussion of the rationale for these standards are attached in inclosure 1 to this appendix.

A set of performance data that are achievable with existing practical treatment technology are presented in inclosure 2. For the purposes of the C-SELM study these performance capabilities have been cast as No Discharge of Critical Pollutant effluent standards. Performance data in this table for advanced biological treatment were based primarily on small scale operating systems, and, for physical-chemical and land treatment, on limited small scale operating experience and on pilot plant and engineering and laboratory studies. Higher performance may be technically attainable by each process. The sources for these performance data are attached in inclosure 3.

By retaining alternatives which use the existing state standards, we should all be able to assess the merits of farther increasing the stringency of treatment standards.

CRITICAL LEVELS FOR CONSTITUENTS

1. The critical levels for constituents shall be based upon the natural background levels of the watercourse or aquifer into which the wastewater effluent is discharged, with specific exceptions of constituents that are highly toxic or otherwise injurious to the environment at trace levels. These levels shall apply as the program technical water quality goal with the exception that:

(a) if current state water quality standards are more stringent, these standards shall apply; or

(b) the environmental scan provides a basis for allowing levels of constituents that are higher than natural background levels but not highly toxic, or otherwise injurious to the environment.

2. a. The following constituents should be absent from the wastewater effluent at discharge, because of their toxicity to the environment at trace levels. The list is based upon limits recommended by the Committee on Water Quality Criteria for water uses such as public water supply, fresh water and marine aquatic habitat, and irrigation. (See Figure B-1)

Arsenic	Lead
Barium	Pesticides and other synthetic organics
Boron	Phenols
Cadmium	Selenium
Chromium	Silver
Copper	Zinc
Cyanides	Mercury

b. Absence of these constituents in wastewater effluent is recommended in view of their risk to public water supply safety and environmental degradation compounded by potential effects of synergism and biomagnification.

c. Synergism is a complicating interaction, in which two or more compounds acting together may have an effect on organisms greater than the sum of their separate effects. For example, the toxic effects of mercuric salts are accentuated by the presence of trace amounts of copper. Cadmium acts as a synergist with zinc and cyanide in the aquatic environment to increase toxicity. (Toxic Substances, pp. 8-9).

d. The results of the interaction between living organisms and chemical substances are often unpredictable, but such interaction may produce materials that are more dangerous than the initial pollutants. Biological magnification is a chronic effect of toxic pollutants such as heavy metals and pesticides. Inorganic mercury once was thought to settle safely into the bottom sediments when discharged into water. Anaerobic bacteria are now known to convert inorganic mercury into very toxic and soluble organic mercury compounds, such as methylmercury, which pass through the food chain by aquatic algae and by fish, eventually reaching man. (Toxic Substances, p. 8)

e. In addition, the following constituents are considered to constitute a potential environmental and hygienic risk such that their absence is desirable, although presence at natural background levels may be permissable based upon an environmental scan.

Antimony	Nickel
Beryllium	Thallium
Cobalt	Tin
Molybdenum	Titanium

f. In the event that treated wastewater will be discharged into estuarine or marine waters where public water supply or irrigation are not present or anticipated uses over the planning period, the appropriateness of requiring absence of certain of these constituents can be assessed by an environmental scan. The accumulation of these constituents in the aquatic environment and, in particular, the food chain cautions against their dispersal. The Council on Environmental Quality states, ".... as our knowledge of heavy metals and other toxic substances expands, new problems will become apparent. For example, it has been suggested that other elements such as cadmium and arsenic, may concentrate in highly toxic forms in a fashion similar to mercury." (Second Annual Report, p 227.) Potential synergism and biomagnification will be considered in the environmental scan.

3. a. In the absence of determining natural background levels or conditions for a particular watercourse or aquifer, the following levels should assist in determining the maximum acceptable levels for design. These effluent levels may be relaxed upward on the basis of the environmental scan.

b. The following constituents along with those listed in paragraph 2. comprise the minimum acceptable group that must be considered in system design in all studies. Other constituents should be considered as appropriate, depending upon characteristics of the region.

Constituent	Effluent Level
Total Dissolved Solids	Less than 500 ppm in "fresh" water
Biochemical Oxygen Demand$_{5\ \mathrm{Day}}$	BOD level less than 2 ppm. BOD level equal to or less than dissolved oxygen level

Constituent	Effluent Level
Heat	Less than plus or minus 1°C of ambient temperature
Color	Less than 75 color units
Nitrates and Nitrites	Less than 4 ppm total
Ammonia as nitrogen	Less than 0.1 ppm
Organic Nitrogen	Sum with nitrates and nitrites less than 10 ppm
Phosphates	Less than 50 micrograms/liter entering a lake; or 100 micrograms/liter entering a flowing stream
Oils and Greases	Trace
Fecal Coliform Organisms	Less than 200/100 ml
Suspended Solids	Less than 2 ppm

c. These constituents should be given particular consideration in system design as warranted by their impact in each region.

Constituent	Effluent Level
Virus	Inactivated, but present at trace levels
Surfactants	Trace
Fecal Streptococci	Inactivated, but present at trace levels
Tastes and Odors	None offensive
Floatables	None
Settleable Solids	Trace
Volatile Solids	Trace
Gamma Radiation	Trace
Alpha Radiation	Less than 1 pico curie/liter
Beta Radiation	Less than 100 pico curies/liter
Turbidity	Less than 5 Jackson units

Constituent	Effluent Level
Alkalinity	Less than 100 to 130 ppm when pH is between 6.0 and 7.0
Carbon Dioxide	Less than 25 ppm
Sulfates	Less than 10 ppm
Calcium	Less than 30 ppm
Chlorides	Less than 250 ppm
Sodium	Less than 10 ppm
Magnesium	Less than 125 ppm
Fluorides	Varies from 1.7 ppm at 10°C to .8 ppm at 30°C
Aluminum	Less than 1 ppm
Bicarbonates	Less than plus or minus 50 ppm variation over ambient concentrations
Manganese	Less than .5 ppm

4. The list of initial constituents was established after a thorough literature research, and was based primarily upon the Report of the National Technical Advisory Committee on Water Quality Criteria. The most stringent levels from among those required for public water supply, irrigation water, livestock water, and aquatic habitat are generally felt to reflect the desirable upper limits in fresh water in the absence of knowing the natural background levels. In some instances, these levels may be less appropriate for marine and estuarine waters.

FIGURE B-1

CONTROLLING USES REQUIRING ABSENCE OF TOXIC CONSTITUENTS

CONSTITUENT	CONTROLLING USE(S)	TOXIC EFFECTS
Arsenic	Public Water Supply	Arsenic trioxide is exceedingly toxic to most animals. It is cumulative in the tissues of many organisms. In arsenate form, it is an antimetabolite, reacting with proteins and enzymes. It is possible carcinogen in water.
Barium	Public Water Supply	Barium forms a stable precipitate or chelate with essential metabolites, causing toxicity.
Boron	Public Water Supply	Boron is an essential element for plants, but is toxic to most plants in concentrations greater than 1.0 ppm. Ingestion of boron can upset the central nervous system. Continued ingestion leads to the clinical syndrome of borism. Borate is an antimetabolite. Synthetic boranes are highly toxic.
Cadmium	Public Water Supply	Cadmium toxicities are implicated in hypertensive diseases of man. Irrigation water needs very stringent control of cadmium to insure that cumulative amounts in plants are not a problem. Synergistic effects with zinc are a problem. Cadmium combines with cell membranes, affecting permeability. It may cause cell membrane ruptures. Cadmium may also lead to to heart disease, and possibly cancer.
Chromium	Public Water Supply	Both chromic and chromate ions are needed by plants in small amounts, however, at higher than trace levels, chromium ions accumulate in plant and animal tissues, causing toxicity.
Copper	Public Water Supply	Copper is highly toxic to algae, seed plants, and invertebrates. It is moderately toxic to mammals. Copper acts synergistically with cadmium, zinc, and mercury, but is not a systemic poison like mercury or lead. Fresh water fish are also quite susceptable to copper poisoning.

FIGURE B-1

CONTROLLING USES REQUIRING ABSENCE OF TOXIC CONSTITUENTS

CONSTITUENTS	CONTROLLING USE(S)	TOXIC EFFECTS
Cyanides	Public Water Supply	Hydrocyanic acid and its salts, the cyanides, are extremely toxic. Toxicity increases with rising temperatures and decreasing pH. Complex cyanides are formed with cadmium and zinc that are much more toxic than the ordinary salts.
Lead	Public Water Supply	There is a considerable variation in toxicity among the various forms of lead. However, it is a cumulative poison. Chronic lead poisoning occured in animals when 0.18 ppm was consumed from soft water. Lead can combine with cellular membranes obstructing the passage of nutrients and can cause bursting of the cell membrane.
Mercury	Fresh water Aquatic and Marine Aquatic Habitats	Some organic mercury compounds are able to enter the food chain of aquatic plants, algae, and lower forms of animals. This methylmercury can be biologically magnified to the extent that it can cause death in humans. Methylmercury can destroy cells of the brain causing tremors and ulcers, it can accumulate in the kidneys and liver. Methylmercury can also accumulate in fetuses where it can produce birth defects by breaking chromosomes. Trace amounts of copper can greatly increase toxicity. Shellfish will accumulate very high quantities of methylmercury.
Pesticides and other Synthetic Organics	Public Water Supply	Chloronated hydrocarbons are very persistant. Organophosphates hydrolyze rapidly to harmless or less harmful products. Cholinergic carbamates and organophosphates are highly toxic to mammals and fish. Chloronated hydrocarbons may accumulate in animal tissue in high enough levels to preclude human consumption. Phenoxy acid herbicides are subject to rapid biological degradation in soil, but their decomposition in water is not well understood.
Phenols	Public Water Supply	Phenols taint the taste and odor of drinking waters in very minute quantities. Fresh water fish are affected by phenols, the result being anything from intoxication to paralysis to death.

FIGURE B-1
CONTROLLING USES REQUIRING ABSENCE OF TOXIC CONSTITUENTS

CONSTITUENTS	CONTROLLING USE(S)	TOXIC EFFECTS
Selenium	Public Water Supply Irrigation Waters	Selenium poses a special problem for mammals in that it is very easily transmitted through the mammary glands to the milk. Biological magnification in plants is possible, up to 4 to 5 ppm. Ingestion of the plants will cause toxic symptoms in animals. As little as 0.05 ppm of selenium in solution will induce biological magnification. Cereal grains and pasture grasses are the most common plants to biologically magnify selenium and cause toxic reactions in humans and cattle.
Silver	Public Water Supply	It is highly toxic to plants and mammals.
Zinc	Public Water Supply and Fresh and Marine Aquatic Habitat	It is accumulated in coelenterates and mollusks. Very small ammounts of zinc are toxic to oysters. It has also produced toxic results in plants.

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MINIMUM LIST OF CRITICAL CONSTITUENTS
AND
PERFORMANCE OF BEST AVAILABLE TECHNOLOGY

		EFFLUENT LEVEL		
Constituents		Advanced Biological	Advanced Physical-chemical	Land
COD	mg/l	10 A/	10 A/	6 C/
BOD, 5-day	mg/l	3 A/	3 A/	2 C,D/
Suspended Solids	mg/l	1 29,30,33/	1 29,30,33/	0 C,D,E,/
Dissolved Solids	mg/l	350	350	400
Soluable Phosphorus	mg/l	0.1-0.2 (26,28/ (29,33/	0.1-0.2 (26,28/ (29,33/	0.01 C,E/
NH_3 as N	mg/l	0.3 21,33/	0.5 B/	0 C,D,E/
NO_3 as N, NO_2 as N	mg/l	2-5 21,33/	2 B/	2 C,D,E/
Organic Nitrogen	mg/l	0 A/	0 A/	0 C,D/
Heat, Temp.	mg/l	53-78	53-78	55-70
Oils, Greases	mg/l	1 A/	1 A/	0 C,D/
Phenols	mg/l	0.01 F/	0.01 F/	0 C,D,/
Pathogens, Viruses	mg/l	Present* 30/	Present* 30/	0 C,D/
Trace Metals**	mg/l	0.1 F/	0.1 F/	0 C,D,/
Boron	mg/l	1.0 F/	1.0 F/	0 C,D/
Arsenic	mg/l	0.03 F/	0.03 F/	0 C,D/
Cyanide	mg/l	0 F/	0 F/	0 C,D/

*Present with current disinfection practice

**Trace metals: Aluminum, cadmium, chromium, copper, lead, nickel, zinc, iron, manganese, mercury

KEY TO EFFLUENT QUALITY FOOTNOTES*

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STAGE III - PART 3

SOCIO-ENVIRONMENTAL IMPACT ANALYSIS METHODOLOGY

1. The development of the impact evaluation procedure was based on an analysis of the processes by which alternative wastewater management systems would affect the environment and likewise the quality of life. It was concluded that four sets of parameters interact in the impact process. These are: (1) system components, the physical and output characteristics; (2) those resources which comprise the environmental attributes of the area; (3) those human activities which make-up man's social well-being; and, (4) the relative worth of human values and goals. It is concluded that the system elements and characteristics create changes (positive or negative) in environmental conditions and the availability of resources. These changes then modify the effectiveness with which people conduct their activities and also modify the alternative activities that are available. Then, the modified activities or human states-of-being affect human satisfaction relative to the values and goals being pursued. Values placed on activities or goals vary among people and groups of people, so the same changes (impacts) are valued differently, depending on the point of view.

2. The evaluation teams have established value weighting constants which represent their opinion as to what human activities are of more relative "value" than other activities. Briefly described, the evaluation procedure attaches numerical ratings to alternative wastewater management systems and their components by first identifying the impacts on environmental elements, then determines how this affects human activites, and finally ascribes a "value" or significance weighting to those effects.

3. The attached checklists identify and describe the environmental elements and human activities which are considered by the evaluation teams.

CHECKLIST VECTOR E_A

I. Water
  Surface
    Quality
      Sensory
        taste
        odor
        color
        turbidity
        suspended and floating matter
        algae
        oil and grease
        phenols
      Temperature
      Nutrients
        phosphorus
        nitrate, nitrogen
        total organic nitrogen
      Mineral content
        pH
        alkalinity
        hardness
        trace elements
        salts
        gaseous products
        accumulated residues
      Health aspects
        TOC, COD, BOD
        DO
        total coliform
        fecal coliform
        fecal streptococci
        protozoa
        insects and insect larvae
        toxic substances (including pesticides and herbicides)
        radioactive substances

II. Quantity
        dilution water
        water supply: minicipal, agricultural, industrial, recreational
        water supply storage
        flooding
        sediments: erosion, deposition, transportation
        navigation
        lake levels
        hydroelectric
        spatial distribution, temporal distribution

III. Subsurface
  Quality
        Sensory - items as above
        Temperature - items as above
        Nutrients - items as above
        Mineral content - items as above
        Health aspects - items as above

IV. Quantity

water supply: minicipal wells, private wells
ground water recharge: confined and unconfined aquifers

V. Air Quality

gases
- SO_2, SO_X
- NO_2, NO_X
- CO, CO_2
- hydrocarbons
- aldehydes

particles
- nonviable: aerosols, mists, dust, smoke
- viable: pollen grains
  - micro-organisms: algae, fungi, molds, yeasts, smuts, rust, spores, bacteria
  - insects

climate
- atmospheric moisture: humidity, cloud cover, fog, precipitation
- temperature
- wind

VI. Sensory Stimuli

noise
odors
visual
irritants

VII. Space, Land Use and Facilities

Agricultural
Residential
Industrial
Commercial
Recreational
Open Space
Cultural
Institutional

VIII. Soil

fertility (A) (B)
infiltration capacity (A) (B)
moisture content (A)
clay content (A) (B)
clay mineral composition (A) (B)
engineering properties: liquidity index, activity index, load bearing capacity (B)
traced elements (A)
salts (A) (B)
surface cover (A)
stability factors under stresses of development and natural weathering [illegible]ent and erosion processes (B)

slope factors (B)
soil biota (A)

IX. Mineral Resources (all phases excluding water resources)

reclamation from process
coal
natural gas storage
liquid petroleum gas storage
non-metallic mineral resources
crushed stone and aggregate
specialty sands
sand and gravel
gravel
high magnesium dolomite
high calcium dolomite
lightweight aggregate
gypsum
ceramic clays
dimension stone: limestone, dolomite

X. Energy and Other Resources (Relative to available supply)

demand
production (e.g., thermal energy, fertilizers)

XI. Changes of Access

Transportation
Communication
Services: Sewer Service, Water Supply

XII. Biotic Communities (Quality as affected by changes in the quality of water, air, and soil as described above--e.g., eutrophication)

Terrestrial Communities (woodlands, grasslands, wetlands)
land plants: trees, shrubs, herbs and grasses
land animals: birde, mammals, reptiles, amphibia, insects etc.
soil biota: fauna (macro-, ceso-, micro-) and flora
dispersal: barriers, corridors
Aquatic Communities (Lake Michigan, lakes and ponds, streams)
aquatic plants
phytoplankta
aquatic animals: zooplankta, insects, crustacea, mollusca, fish
benthic biota
dispersal: barriers, corridors
satisfaction

XIII. Unique or Rare Things

cultural sites and artifacts
archaeological
historical
scientific sites
physical - - features related to Pleistocene glaciation and
relics of Lake Michigan development
Silurian reef structures (in quarries)
Kentland dome - - meteorite impact structure?
Indiana Dunes National Lakeshore: present area, proposed additions
terminal moraines
kettle lakes (many are now bogs)
kames, eskers, or ice crevasse fillings
sand dunes associated with glacial Lake Chicago shorelines
and the Kankakee outwash plain
ancestral Lake Michigan shoreline remnants
bedrock exposures of Silurian and Devonian carbonate rocks,
Devonian Antrim shale and Pennsylvanian Mansfield sandstone
biological - - organisms dependent upon certain habitats and/or with
restricted ranges; endangered species
ecosystems - - characteristic of or unique to this area
scenic sites
unspoiled views
unusual land forms

VECTOR H

Human Dimensions Categories

(To be supplemented by Items of Value Checklist)

I. Production
   A. Commercial
   B. Industrial
   C. Food
   D. Construction Services
   E. Public Service
   F. Private Service

II. Residential Activity

III. Population
   A. Migration
   B. Population Density

IV. Health and Safety

V. Employment

VI. Income

VII. Cultural/Education

VIII. Public Finance

IX. Recreation

X. Aesthetic

XI. Ecosystem Status

XII. Community Structure
   A. Political
   B. Sociological

XIII. Other

CHECK LIST

Vector H

Items of Value

Human Dimensions

I. Production (direct and external economies and diseconomies)

A. Commercial

(1) services

(2) local expenditure

(a) materials and physical inputs
(b) services

B. Industry

(1) output

(2) local expenditure

(a) materials and physical inputs
(b) services
(c) taxes
(d) public service programs

C. Food

(1) output

(2) local expenditure

(a) materials and physical inputs
(b) services
(c) taxes

D. Construction

(1) output

(2) local expenditure

(a) materials and physical inputs
(b) services
(c) taxes

E. Public Services

Services (Local Government)

(1) services provided

(a) fire
(b) health
(c) recreation
(d) transportation
(e) power
(f) water
(g) waste treatment
(h) other sanitation
(i) education
(j) safety services

(2) local expenditure

(a) materials and physical inputs
(b) services

Services (County Government)

(1) services provided

(a) health
(b) recreation
(c) transportation
(d) water
(d) waste
(g) other sanitation
(h) education

(2) local expenditure

(a) materials and physical inputs
(b) services

Services (State Government)

(1) services provided

(a) health
(b) recreation
(c) transportation
(d) water
(e) waste
(f) other sanitation
(g) welfare
(h) education

(2) local expenditure

(a) materials and physical inputs
(b) services

Services (Federal Government)

(1) services provided

(a) health
(b) recreation
(c) transportation
(d) water
(e) waste
(f) other sanitation
(g) welfare
(h) employment services
(i) training services
(j) education
(k) power

(2) local expenditure

(a) materials and physical inputs
(b) services

Services (Private)

(1) services

(a) counselling
(b) relocation

(2) local expenditure

(a) materials and physical inputs
(b) services

II. Residential Activity

A. Quality of the residential & neighborhood environment

1. Crowding
2. Amenity and aesthetic quality
3. Social mix & stability
4. Life style opportunities
5. Access to & spectrum & quality of services & facilities

B. Housing opportunity

1. Spectrum of housing opportunity
2. Quantity of supply
3. Cost

III. Population

A. Net migration to or from the geographic area. If immigration occurs, the impact is positive (+). If emigration, the impact is negative (-).

B. Population density: If increasing agglomeration of population occurs, the impact is positive (+). If dispersion is caused, the impact is negative (-).

IV. Health and Safety

A. Incidence of specific diseases
B. Incidence of accidents
C. Utilization of services

1. health

a. preventive
b. curative

2. safety

a. police
b. fire

V. Employment

A. Supply and spectrum of opportunity
B. Unemployment
C. By relevant sectors

1. education level
2. skill
3. experience
4. sex
5. age
6. ethnicity

VI. Income

A. By relevant sectors

1. employment
2. profits
3. welfare
4. other

B. Income distribution

C. Level of affluence or poverty

D. Disposable income

VII. Cultural/Educational

A. Life styles (demands & consumption)

a. demand for and consumption of education
b. consumption of material goods
c. consumption of non-material services
d. consumption of household goods
e. consumption of leisure goods
f. degree of social atomization
g. job search

B. **Availability and access to unique, cultural and scientific sites, facilities, etc. (supply)**

C. Quantity & quality of formal educational opportunities (supply)

VIII. Public Finance

(1) local tax base

(2) county tax base

(3) state tax base

IX. Recreation — **quantity of opportunity; quality of opportunity; spatial distribution & accessibility**

(1) participatory

(a) summer

1. hiking
2. **fishing**
3. **boating** — **Individual, Family Groups**
4. **swimming**
5. **camping**
6. **picnic**
7. **golf**

(b) fall

1. hiking
2. fishing
3. boating — **Individual, Family Groups**
4. camping
5. picnic
6. hunting

(c) winter

1. hiking
2. fishing
3. camping — **Individual, Family Groups**
4. hunting
5. skating
6. skiing
7. sledding

(d) spring

1. hiking
2. fishing
3. boating
4. camping
5. picnic
6. golf

(2) non-participatory
   (a) viewing competitive sports appropriate to the season
   (b) quantity of opportunity
   (c) quality of opportunity
   (d) spatial distribution & accessibility

X. Aesthetics

A. General level of environmental pleasantness or amenity.
B. Specific aesthetics objects or sites
   1. shopping areas
   2. school developments
   3. parking developments
   4. open space
   5. scenic vistas & natural beauty
   6. public buildings
   7. public art & monuments
   8. etc.
C. Public attitude and concern
D. Institutional attitude & concern

XI. Ecosystem Status

1. ecosystem stability (succession, homeostasis)
2. species diversity
3. food chains
4. productivity - eutrophication
5. biogeochemical cycling
6. concentration of toxic substances
7. disease aspects: vectors, alternate or intermediate hosts
8. introductions - invasions

XII. Community Structure - Rate these items on a scale ranging from 0 to 1 or 0 to 100%. The judge should enter the probability that he thinks best describes the situation.

1. Political
   a. social stratification
   b. special purpose and interest groups
   c. formal political role devel pment
   d. land use control
   e. opposition or dissatisfaction
2. Sociological
   a. services (material, social) agency development
   b. family structure
   c. rural to urban, rural to suburban, to metropolitan world view
   d. perceptions of social integration
   e. racial, ethnic, class mix
   f. neighborhood development
   g. formal systems of control (e.g. police)
   h. antisocial behavior
      1. crime
      2. juvenile delinquency
      3. vandalism
      4. littering

i. community stability
j. quality & quantity of social interaction

XIII. Other

SOCIO-ENVIRONMENTAL IMPACT ANALYSIS

MATRIX A

VECTOR E

ENVIRONMENTAL ELEMENTS

1. SURFACE WATER QUALITY
2. SURFACE WATER QUANTITY
3. SUBSURFACE WATER QUALITY
4. SUBSURFACE WATER QUANTITY
5. AIR QUALITY
6. SENSORY QUALITY OF THE ENVIRONMENT
7. PRESENT LAND USE AND FACILITIES
8. POTENTIAL LAND USE AND FACILITIES
9. SOIL QUALITY
10. MINERAL RESOURCES
11. ENERGY
12. ACCESS
13. BIOTIC COMMUNITIES
14. UNIQUE OR RARE THINGS

VECTOR S

SYSTEM ELEMENTS

1. COLLECTION, TRANSPORTATION, & STORAGE OF INPUT WATER
2. TREATMENT FACILITIES
3. TREATMENT PROCESS(ES)
4. LIQUID EFFLUENT & REUSE
5. SLUDGE MANAGEMENT
6. SYNERGISMS

IMPACT ANALYSIS FORMULA

$$\left[E \begin{array}{|c} S \\ \hline \text{MATRIX A} \end{array} \right] \times \left[E_A \begin{array}{|c} H \\ \hline \text{MATRIX B} \end{array} \right] \times \overset{\text{WEIGHTING}}{\left[\; V \; \right]} = \frac{\text{SYSTEM}}{\text{RATING}} \; R$$

A MATRIX RATING FORM

JUDGE: ___ ___ (1,2) SYSTEM: ___ ___ (3,4) ELEMENT: ___ ___ (5,6) REGION: ___ ___ (7,8)

PRIMARY IMPACT CATEGORY (VECTOR E)	MAGNITUDE OF CHANGE						
	EXTREMELY NEGATIVE	MODERATELY NEGATIVE	SLIGHTLY NEGATIVE	NEUTRAL	SLIGHTLY POSITIVE	MODERATELY POSITIVE	EXTREMELY POSITIVE
1. SURFACE WATER QUALITY	-3	-2	-1	0	+1	+2	+3
2. SURFACE WATER QUANTITY	-3	-2	-1	0	+1	+2	+3
3. SUBSURFACE WATER QUALITY	-3	-2	-1	0	+1	+2	+3
4. SUBSURFACE WATER QUANTITY	-3	-2	-1	0	+1	+2	+3
5. AIR QUALITY	-3	-2	-1	0	+1	+2	+3
6. SENSORY QUALITY OF ENVIRONMENT	-3	-2	-1	0	+1	+2	+3
7. PRESENT LAND USE & FACILITIES	-3	-2	-1	0	+1	+2	+3
8. POTENTIAL LAND USE & FACILITIES	-3	-2	-1	0	+1	+2	+3
9. SOIL QUALITY	-3	-2	-1	0	+1	+2	+3
10. MINERAL RESOURCES	-3	-2	-1	0	+1	+2	+3
11. ENERGY	-3	-2	-1	0	+1	+2	+3
12. ACCESS	-3	-2	-1	0	+1	+2	+3
13. BIOTIC COMMUNITIES	-3	-2	-1	0	+1	+2	+3
14. UNIQUE OR RARE THINGS	-3	-2	-1	0	+1	+2	+3

SOCIO-ENVIRONMENTAL IMPACT ANALYSIS

MATRIX B

VECTOR E_A

ENVIRONMENTAL ELEMENTS

1. SURFACE WATER QUALITY
2. SURFACE WATER QUANTITY
3. SUBSURFACE WATER QUALITY
4. SUBSURFACE WATER QUANTITY
5. AIR QUALITY
6. SENSORY QUALITY OF THE ENVIRONMENT
7. PRESENT LAND USE AND FACILITIES
8. POTENTIAL LAND USE AND FACILITIES
9. SOIL QUALITY
10. MINERAL RESOURCES
11. ENERGY
12. ACCESS
13. BIOTIC COMMUNITIES
14. UNIQUE OR RARE THINGS

VECTOR H

HUMAN ACTIVITIES

1. COMMERCIAL PRODUCTION
2. INDUSTRIAL PRODUCTION
3. FOOD PRODUCTION
4. CONSTRUCTION SERVICES
5. PUBLIC SERVICE
6. PRIVATE SERVICE
7. RESIDENTIAL ACTIVITY
8. MIGRATION
9. POPULATION DENSITY
10. HEALTH & SAFETY
11. EMPLOYMENT
12. INCOME
13. *CULTURAL/EDUCATIONAL*
14. PUBLIC FINANCE
15. RECREATION
16. AESTHETICS
17. ECOSYSTEM STATUS
18. POLITICAL
19. SOCIOLOGICAL

IMPACT ANALYSIS FORMULA

$$\begin{array}{cc} & S \\ E & \left[\text{MATRIX A}\right]\end{array} \times \begin{array}{cc} & H \\ E_A & \left[\text{MATRIX B}\right]\end{array} \times \left[\begin{array}{c}\text{WEIGHTING}\\ V\end{array}\right] = \begin{array}{c}\text{SYSTEM}\\ \hline \text{RATING}\\ \hline R\end{array}$$

AD-A036 650 CORPS OF ENGINEERS CHICAGO ILL CHICAGO DISTRICT F/G 13/2
WASTEWATER MANAGEMENT STUDY FOR CHICAGO-SOUTH END OF LAKE MICHI--ETC(U)
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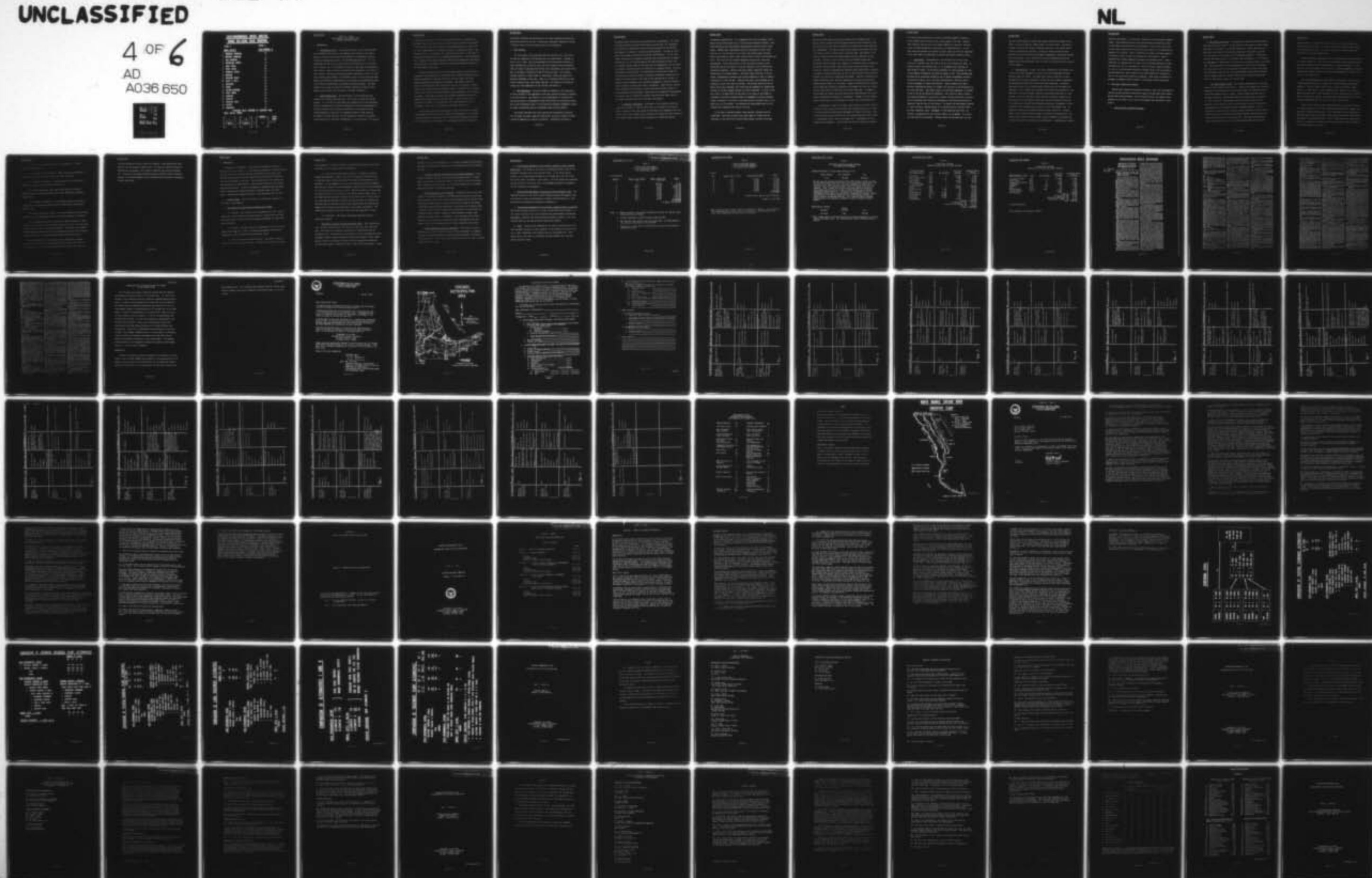

SOCIO-ENVIRONMENTAL IMPACT ANALYSIS

HUMAN WELL-BEING VALUE WEIGHTING

VECTOR H HUMAN ACTIVITIES	VECTOR V VALUE WEIGHTING *
1. COMMERCIAL PRODUCTION	1.2
2. INDUSTRIAL PRODUCTION	.3
3. FOOD PRODUCTION	1.0
4. CONSTRUCTION SERVICES	.8
5. PUBLIC SERVICE	2.3
6. PRIVATE SERVICE	2.0
7. RESIDENTIAL ACTIVITY	1.5
8. MIGRATION	- .2
9. POPULATION DENSITY	-1.2
10. HEALTH & SAFETY	2.8
11. EMPLOYMENT	2.2
12. INCOME	1.8
13. CULTURAL EDUCATIONAL	2.5
14. PUBLIC FINANCE	1.8
15. RECREATION	2.5
16. AESTHETICS	2.5
17. ECOSYSTEM STATUS	2.8
18. POLITICAL	.5
19. SOCIOLOGICAL	1.3

*WEIGHTING VALUES ESTABLISHED BY EVALUATION TEAMS

IMPACT ANALYSIS FORMULA

$$\left[\begin{array}{c|c} & S \\ E & \text{MATRIX A} \end{array}\right] \times \left[\begin{array}{c|c} & H \\ {}^{E}A & \text{MATRIX B} \end{array}\right] \times \left[\begin{array}{c} \text{WEIGHTING} \\ V \end{array}\right] = \begin{array}{c} \text{SYSTEM RATING} \\ R \end{array}$$

STAGE III - PART 4
NORTH BRANCH OF THE CHICAGO RIVER
A RESOURCE DEVELOPMENT PLAN

1. INTRODUCTION

a. Environmental Goals. The Chicago-South End of Lake Michigan Wastewater Management Study has two environmental goals implicit within study purpose, and uses the collection and treatment of all waterborne waste as the primary implementing vehicle. The environmental goals are: (1) the improvement and control of the water quality and flows in all of the study area's streams; and, (2) development of plans for open space lands bordering area streams so that an effective recreation and conservation use is made of this resource. This means controlling permanent development within the flood plain; placing major emphasis on satisfying as much of the concentrated urban demand for recreational opportunities as is possible; and providing the basis for an effective preservation and resource restoration program. The major streams in the study area include the DuPage, DesPlaines, Chicago, Little Calumet, Grand Calumet, and Deep Rivers, and their tributaries.

b. Special Model Study. The North Branch of the Chicago River was selected for a special prototype study. This reach of stream was selected because: (1) it involves an area where the residents are actively promoting specific conservation and recreation programs and thus are knowledgeable of the local problems; (2) the nature and diversity of the stream and land-related problems are such as to be considered typical of those existing throughout the study area; and, (3) the demographic conditions (population characteristics) are considered representative of the urban area. The purpose

of this special study is to develop a comprehensive plan of improvement for the North Branch which identifies the various types of recreational opportunity and conservation programs feasible of being implemented in an urban area. Then these improvements are designed and costed on a preliminary basis. This framework plan is so constructed as to facilitate selection of those types of programs and activities which are considered appropriate for each geographical area. Members of the Citizens Advisory Committee for Conservation and Environmental Interests (hereinafter referred to as Advisory Committee) assisted in the development of this plan.

A physical clean-up of the river and adjacent lands is an obvious base requirement for developing any recreational plan. Since the Chicago District has been authorized to clean up a portion of the main stem of the North Branch, appropriate cost figures are available. The project involves a stretch of stream twelve miles long and provides for the clearing of fallen trees, roots, ensnarlements and unnatural objects. All debris in the channel lines will be removed to approved disposal areas provided by a local cooperating agency. Such clean-up projects are considered desirable because of the enhanced environmental quality that will result. The appearance of the stream will be improved and recreational use in adjoining lands will be encouraged. There will be no dredging or permanent construction.

The following development plan defines a viable recreation and conservation program which would serve as an effective planning model for any urban-related watercourse in the study area. The basis for formulating this plan of improvement were the responses to a questionnaire which was prepared by

the Advisory Committee and distributed to all known conservation groups and interested parties in the area. Recreational development suggestions offered by Federal, State, and local agencies were also incorporated.

2. RIVER CORRIDOR

The first phase of the prototype study was directed by Dr. Jack Snarr, the Advisory Committee's Vice-Chairman and is included herein. Through the efforts of Dr. Snarr, some 130 questionnaires were distributed primarily to those residents who it was felt could and would respond as soon as possible. Since the study is operating under severe time restrictions, only those forms, some 41 in number, received by 19 May 1972 were utilized. The response, although limited to a small number of individuals, comes from people with intensive knowledge of this area. Hence it is considered reflective of what could be expected from a much larger sampling. The results of the sampling program have been summarized and are attached (Attachment 1).

a. Plan Formulation. The basic assumption necessary to the formulation of river corridors is the upgrading of the water quality and aquatic ecosystem of the North Branch. Also implicit is the establishment of a minimum base flow and provision of supplemental stream flows during the recreational season. This would be achieved by most of the alternative wastewater management systems now under consideration and the recommended stream clean-up program.

The primary planning effort thus involved the delineation of selected river frontage for public usage and conservation practices; thereby providing a balanced framework for resource utilization. Formulation was based on

incorporating the following in any proposed plan of improvement: (1) a base of stream-oriented and related land recreation facilities; (2) a greenbelt for instituting a program for restoration and enhancement of the existing environment; (3) control of the area's wildlife habitat. Creation of such a managed environment involves three different considerations: (1) the river itself--particularly its aquatic ecology and flow characteristics for general recreational use; (2) existing usage of the land bordering the river; and, (3) optimum projected usage of the river and its compatibility with the area's total needs, considering social well-being as the ultimate concern. Effective implementation would include: fee acquisition of those areas suitable for stream-related fishing and general recreational activities; recreational use zoning; flood plain zoning; controlled access; application of cultural or land-use control easements; and, vegetative management to achieve separation between different programs and resource commitments. Other specific developments considered were planting to control flood plain erosion, repair of existing dams and bank revetments, construction or restoration of impoundments and lagoons, and the provision of riffles, deep pools, and shade trees to encourage in-stream production of desirable fish species.

b. Development Requirements. Achievement of the program's objectives would require control of land on either side of the stream, with adequate length to assure a base large enough to incorporate good management practices. Certain sites on the stream would be preserved or restored and then retained in their natural state; others would be developed for fishing and general

recreational opportunities. It is suggested that sites for general recreational use be located within city or village limits whenever possible. This would facilitate providing adequate parking spaces and help control public access. Whether small impoundments should be encouraged on public lands would be up to the discretion of the local land holding agency involved. Static water bodies on public lands could be used for various recreational pursuits. This plan will not identify suggested locations for clean water impoundments. Since a good portion of the flood plain acreage is still undeveloped and in some cases is in public ownership, river corridors are conceptually feasible. Preserve land would remain "preserved" largely for hiking trails or wildlife habitat. Additional lands would have to be purchased, supplemented by easements and zoning ordinances in order to insure a continuity of control and use. Lands may also have to be purchased at the perimeter of recreation areas for parking. The corridor would be a mix of public and private ownership, with restricted-use easements for preservation required on certain acreages retained in private ownership. A strip of land 40 to 300 ft. in depth from the high bank on both sides of the stream is considered a sufficient working acreage for management and action programs. However, dedication or set-back of this land would be variable; that is, the depth would not be constant. No relocation and resettlement would be considered where residences and industry now exist.

In the case of the North Branch, three specific corridors would be established. The first corridor would extend some 24.5 miles from the confluence of the river with the North Shore Channel, proceed up the main

stem of the North Branch and along the Skokie River to Highland Park. A second corridor, some 13 miles long would extend from the confluence of the West Fork with the Main Stem, and proceed up the West Fork to Half Day Road, near Lincolnshire. The third corridor would proceed up the Middle Fork from its confluence with the Skokie River to Half Day Road. Development of the sites for general recreational opportunities would be encouraged in these corridors. Sections of each corridor would be retained as open space, especially between villages, with emphasis on restoration and/or preservation of natural flora and fauna. Bank fishing sites would be provided on the corridors. Specific landscaping with adequate buffer zones would be necessary to separate recreation areas from the rest of the green belt, which would be retained in a natural but controlled environment. Location of fishing sites, general recreation areas, and boat launching and take-out areas should be planned within village, or city limits. Depths of the North Branch upstream of the North Shore Channel are generally not adequate for motor boat traffic, and the river should be restricted to non-motor watercraft. An example of recreational-use zoning, this would help control noise pollution in an area which is essentially residential in development. Bridges, or road crossing points should serve as center points for access to the recreational areas.

A representative sample of villages, park districts and forest preserve districts located along the North Branch have expressed interest in a range of recreational and preservation developments for specific locations. Some of these interests were identified for this revised plan after public review of a preliminary draft resource development plan. Coordination has been summarized in Paragraph 4. Land outside the areas of intense recreational

activities would be preserved to provide a restricted number of pursuits such as hiking trails, bicycle trails, nature paths or the like. Adjacent lands presently used for golf would remain committed to that use. One golf course is being considered for conversion to an industrial site. If this land cannot be purchased and retained in public usage, an effective vegetative buffer zone should be established to preserve the stream's esthetic values.

c. Land Control. Establishment of the corridors will cause a minor reduction in assessed land values which serve as the counties tax bases. To partially offset the potential loss, it is recommended that ownership of these lands be varied. As previously mentioned, all land developed for fishing and general recreational use should be bought in fee. The remaining land portions can be controlled through the use of special development set-backs restrictive in nature, but at the same time designed to offer the owner a special inducement to insure participation. Basin residents must make a decision concerning the amount of acreage to be acquired in the development of the river corridors. Open space zoning is an effective supplement to purchase in fee or the use of restrictive easements. Care should be taken to insure that land-use planning is restrictive in nature and that flood plain intrusion such as residential and industrial development be restricted and buffered by vegetation from the rest of the corridor. To enhance the environmental aspects of these corridors, planting should be in concentrations of selected timber and other vegetative cover. Management of the vegetation will affect the wildlife, recognizing that only wildlife habitat can be managed. Nut producing trees should be encouraged. Planting should include white oak, red oak,

burr oak (oaks confined to larger land holdings away from flooding), black walnut, various ash species, shaking aspen, and black willow. The species listing for other rivers in the C-SELM area would vary to a limited extent from the aforementioned plantings. Planting of smaller shrubs and tree species such as red and yellow twig dogwood, honeysuckle, and mulberry should also be encouraged. This, together with selected herbaceous species and grasses should provide adequate cover to resist soil erosion, as well as good wildlife habitat.

d. Implementation. To date, the lands encompassed by the proposed river corridors have been earmarked for public use by the Northeastern Illinois Planning Commission (NIPC). The green-belt concept of NIPC has not been implemented by necessary ordinances, nor have the full economic consequences of removing these lands from the tax rolls been ascertained. Therefore, additional studies will be required before acquisition and development are undertaken. Some villages (e.g. Glenview) have realized the potential of the North Branch and have proposed commercial-recreational development of river frontage. Since the use value of the corridors is directly related to the water quality and flow regimen control which would be achieved by adoption of an appropriate regional waste treatment alternative, development of these corridors should be phased and made part of a total development plan. An appropriate study should establish design controls relative to: acreage; usage; costs, including annual charges for operation and maintenance of the various stream reaches; and the zoning, type of ownership, and adjusted tax structure necessary to encourage local participation. Implementation funding

should be time-phased to coincide with construction of the regional treatment system. Participating State and local agencies would be offered the option of cost-sharing the acquisition and development of the corridor lands under current Federal programs and acquire land deeds, subject to an administrative agreement to be defined. Table A identifies the amount of acreage suggested for purchase in fee, as well as an estimate of costs involved. Table B identifies the acreage suggested for easement and estimated costs. Table C identifies the estimated cost per basic unit for selected planting of linear purchased areas and for reforestation. Table D provides a sample breakdown of costs of three different recreational packages which could be provided at the purchased areas. Map A identifies the lands suggested for purchase in fee or to be acquired by restrictive easements. Those lands not effected by purchase or easements would be subject to flood plain zoning restrictions.

3. APPLICABLE CONSERVATION PROGRAMS

Federal grant conservation programs available to State and local agencies include the Land and Water Conservation Program, the Open Space Land Program, and the Urban Fishing Program. The following discussion will examine these programs as they relate to the resource development plan identified in Paragraph 2.

a. Land and Water Conservation Program.

b. Open Space Land Program. The Department of Housing and Urban Development administers this program. An Open Space Kit which gives detailed program information is available to interested communities. Briefly described, the Open Space Land Program provides grant assistance to local public agencies for acquiring and/or developing land for open space purposes. Acquisition of lands in less-than-fee simple is allowable under the program. It is necessary for development or improvement to be carried out on publicly owned or controlled land. The Program will not provide assistance in the form of reimbursement for costs incurred prior to an applicant's reception of a letter authorizing him to proceed at his own risk. The attached pages of the Federal Registers dated 25 November 1971 and 14 April 1972 detail the selection system under which all applications compete for limited funds.

c. The Urban Fishing Program. This program is administered by the USDI, Bureau of Sport Fisheries and Wildlife. Although this program is not directly applicable to the North Branch of the Chicago River, it is applicable to the resource development model in concept. Recent attempts have been made to introduce fishing as a readily available and functional form of recreation in "core" city areas. Metropolitan area waters open to public use are generally of poor quality, thereby restricting the existence of desirable fish populations and negating satisfactory angling experience. Proper orientation of regional waste treatment systems can provide a water supply of sufficient quality and quantity to encourage desirable fish populations and likewise urban fishing in metropolitan areas. The Urban Fishing Program should become more attractive to the Chicago Metropolitan Area when water

qualities improve. Two methods have been tried to introduce fishing into certain metropolitan areas: (1) busing city youths to stocked ponds outside the metropolitan area; and, (2) stocking fish in municipal park ponds and lakes within low income neighborhoods.

Of the two methods, bringing the fish to the people was the most effective. In a sample program, St. Louis in 1971, wild-trapped carp and bullhead catfish provided city dwellers with 80,000 man-days of recreation angling. In 1971 the total cost per fisherman day was only 38¢. Tighter management and improved stocking rates should insure that the 1972 program results will show a 25¢ or less cost per fisherman day.

The Illinois Department of Conservation is interested in the use of two of the Chicago Park District's lagoons for an urban fishing "put-and-take" operation. The park district has 72 acres of ponds and lagoons in high priority, or high crime, low-income neighborhoods. Based on the 4,000 man days per surface acre of water generated in the St. Louis program, if these 72 acres of lagoons were stocked, the Chicago Urban Fishing Program would result in almost 300,000 man days of totally new inner city recreation.

Although these intensive Urban Fishing Programs are extremely effective to introduce angling to the young, unemployed and retired city citizens, even more urban fishing potential exists. This "potential" could be realized by improving water quality in streams, lakes, ponds, quarries and lagoons within and adjacent to metropolitan areas. Water of improved quality, where public access is obtainable, can sustain new and varied types of outdoor recreation to the urban population, such as:

(1) Natural, self-sustaining game fish populations in suitable larger rivers and lakes.

(2) Put, grow and take fisheries. Small fish are stocked, grown to catchable size, and then harvested under controlled conditions.

(3) Put-and-take fisheries. Catchable sized fish are stocked and harvested with application of enforced creel limits.

(4) Trophy fish waters. Only large sized fish may be creeled. Artificial lures are usually required and the water fished only during daylight periods.

(5) Fish and pay operations. Local villages operate a lake under a minimal daily fee system with monies collected financing the restocking of catchable fish.

(6) Nature interpretive centers. Areas are established and facilities developed for the interpretation of both terrestrial and aquatic ecosystems.

(7) Conservation-education workshops and outdoor classrooms. These classrooms can be designed using programmed teaching facilities for instruction of urban children to basic environmental concepts. Imaginative and intensive fishery management programs such as the aforementioned, would insure literally millions of man days of available angling within the metropolitan area.

Technical assistance in reclaiming the water, developing recreation facilities and establishing fish populations requires the joint efforts of such organizations, including the Department of the Interior and State Con-

servation Departments of both Illinois and Indiana. Local agencies and local sponsors must be expected to assume much of the financial burden and assist in administering the program. With inspired leadership and dedicated planning, such a task force can develop valuable and people oriented outdoor recreation programs, with primary emphasis on the reclamation and utilization of presently unusable water areas.

4. COORDINATION

As discussed in Attachment 1, the basis for this phase of the plan of improvement are the responses to a questionnaire distributed to conservationists and other interested citizens along the North Branch of the Chicago River. Some information gathered from park districts and forest preserve districts were also incorporated in the model. The preliminary draft was presented to representatives from park districts, forest preserve districts, and villages along the North Branch. It was also presented to representatives from appropriate conservation and planning agencies at regional, State and Federal levels. Responses and comments received on that preliminary draft include:

a. General Comment. The river corridor is conceptually acceptable (at all levels of coordination).

b. Park Districts, Forest Preserve Districts and Villages.

(1) *Glenview:* The village is very interested in the river corridor concept for the North Branch particularly since it reflects their own "West Fork Green" plans. The land acquisition program recommended by Glenview has been incorporated.

(2) Wilmette: The park district is interested in the use of a high quality water supply for a small flow-through impoundment which would be incorporated as part of their newly acquired golf course.

(3) Lake County Forest Preserve District: The district expressed interest in the river corridor concept. The district is currently acquiring

a site adjacent to the North Branch as a preserve which therefore would be in consonance with the proposed plan of improvement.

(4) Cook County Forest Preserve District: A generally favorable response was expressed. However, the idea of locating a fish hatchery with put-and-take ponds on existing preserve land along the North Branch was not acceptable. It was suggested that use of the high quality water for impoundments and the location of those impoundments should be left up to the discretion of the local land-holding agency involved. Mention was made of a bicycle path now being constructed on preserve land from Devon Avenue to Harms' Woods. It was noted that the restricted easements are too small (20 ft. on each side of the river from the high bank) to permit any type of public use; instead the functions were for creation of buffer zones (between river and existing land usage) and for esthetics and enhancement of the stream's environment. Purchased areas would still allow and in most cases encourage public access.

(5) Northfield: The village recommended additional areas for restrictive easement.

c. Northeastern Illinois Planning Commission (NIPC). NIPC supported the river corridor concept since it fits within its open space land acquisition plan. They supported the specific delineation of recreational areas for purchase in fee. The feasibility of open-space corridors connecting the rivers corridors to NIPC's proposed open-space acreage was discussed. While supporting the concept of connecting corridors, NIPC also suggested consideration of using power company transmission rights-of-way for the same purpose. A copy

of NIPC's proposal for development of its open-space program was furnished as the basis of evaluating the feasibility for establishing critical connecting corridors.

d. Lake-Porter Regional Transportation and Planning Commission. Lake-Porter was asked to respond to the resource development model as it might apply to the streams in Northwest Indiana. The agency's reaction was favorable to the river corridor concept and a recently prepared map was obtained depicting the agency's open-space proposals.

e. Illinois Department of Conservation. Although in favor of the river corridor as a conceptual approach, the State did not feel that the put-take ponds included in the over-all Urban Fishing Program should be applied to the area along the North Branch. Instead this particular proposal was thought to have more value and be more applicable to the inner city and ghetto areas of Chicago. The Division of Fisheries was interested in the possibility of providing a small tributary leading into Lake Michigan to support their salmonoid stocking program. Furthermore, it was concluded that the North Branch would not require any instream structural improvements since water quality is the primary degrading factor of this potentially good stream.

f. Indiana Department of Natural Resources. The Division of Outdoor Recreation is in favor of both the river corridor recreational development concept, and regional planning to satisfy recreational needs. The State at this time is not in favor of the Urban Fishing Program but felt that it offers potential for the future.

g. United States Department of the Interior, Bureau of Sport Fisheries and Wildlife. The Bureau is interested in encouraging various types of fish management programs within urban-suburban areas. If the States express interest in the Urban Fishing Program for the C-SELM area, then the Bureau would gladly make a statement to that effect. Since the States have expressed limited interest at this time, other fish management programs are suggested for the C-SELM area in Paragraph 3c.

h. United States Department of Housing and Urban Development (HUD). HUD expressed interest in our river corridor planning approach and suggested that we coordinate closely with Northeastern Illinois Planning Commission. HUD's Open Space Land Program was discussed in Paragraph 3a.

i. United States Department of the Interior, Bureau of Outdoor Recreation. The Bureau's general reaction to our river corridor model was favorable. A lot of daily recreation use can be expected from urban-suburban recreational development. BOR will soon furnish design information relevant to the river corridor model and the Land and Water Conservation Program.

j. Other. Electric power companies in the study are being asked to provide statements relating to their interests in and liability concerns for the use of their transmission line rights-of-way for recreational use. These rights-of-way could serve as connecting corridors between river corridors and/or open-space lands.

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PRELIMINARY COST FIGURES

TABLE A

ACREAGE ALONG NORTH BRANCH
OF THE CHICAGO RIVER SUGGESTED
FOR ACQUISITION IN FEE

Fee Acquisition

Site No.	Approx. Size (Acres) *d	Approx./Acre Value *a, b, c	Total
1	1.9	$40,000	$ 76,000
2	66.0	55,000	3,630,000
3	797.1	25,000	19,927,500
4	55.1	25,000	1,337,500
5	22.0	25,000	550,000
6	20.0	12,000	240,000
7	24.2	30,000	726,000
8	110.2	25,000	2,755,000
9	170.1	8,000	1,360,800
10	20.0	55,000	1,100,000
			$31,702,800
		or approx.	$32,000,000

*Note: a. Based on direct or interpolated information from the 1971 Olcott's Land Values Blue Book of Chicago.

b. No field inspection or market research study was made.

c. The reference sited above is for land values only. Any improvements on the sites are not included in the estimate.

d. Acreages were scaled from the provided map and should be considered as approximate figures.

PRELIMINARY COST FIGURES

TABLE B

ACREAGE ALONG NORTH BRANCH
OF THE CHICAGO RIVER SUGGESTED
FOR ACQUISITION BY EASEMENT

Easement Site	Approx. Size* (Acres)	Approx./Acre Value*	Total
A	5.8	$35,000	$ 203,000
B	2.0	35,000	70,000
C	12.6	30,000	378,000
D	7.7	25,000	192,500
E	14.2	25,000	355,000
F	7.4	25,000	185,000
G	3.7	25,000	92,500
H	10.6	30,000	318,000
			$1,794,000
		Easement Cost @ 80% fee value	$1,435,200
		or approx.	$1,435,000T

*Same conditions apply to these figures as identified in Table A. Size is based on the linear measure of easement; the linear distance is then multiplied times a 20 ft. width requirement on both sides of the stream.

TABLE C

ESTIMATED COSTS FOR SELECTED PLANTING
OR REFORESTATION PROGRAMS

Selected Planting* on Linear Sites Purchased In Fee

Linear Mileage	Est. Cost/Mile	Cost
6 Mi.	$40,000	$240,000

*In this case the project-associated trail would provide a system of hiking and bicycling trails along the linear areas suggested for acquisition. In response to the expressed concern of local interests for preservation of existing values, the vegetative pattern will not only be preserved, but enhanced. Trees, shrubs, and ground cover plants would be introduced. These plants would be native or other climate-adapted species planted within the right-of-way lines. Planting would be designed to provide informality, unity, scale, erosion control, separation of function, screening and traffic control and would take into consideration existing and future land use of property adjacent. These measures would contribute significantly to the aesthetic enjoyment of outdoor recreation participation.

Reforestation Program

Acreage**	Average Cost/Acre	Cost
240 acres	$100	$24,000

**This acreage figure is based on the amount of acreage suggested for purchase times a percentage ratio. The seedlings would consist of approximately 15 species.

PRELIMINARY COST FIGURES

TABLE D_1

RECREATIONAL PACKAGES
EXAMPLES OF FACILITIES AND COSTS INVOLVED

Recreational Node (for Larger Sites)	Unit	No. of Units	Unit Costs Dollars	Estimated Amount Dollars
Play Field	Each	3	$ 2,400	$ 7,200
Winter Sports Arena	Each	1	50,000	50,000
Picnic Units	Each	150	210	31,500
Amphitheater	Each	1	48,000	48,000
Boat Launching (Concrete Ramp)	Each	3	3,600	10,800
Comfort Station	Each	9	42,600	383,400
Shelter	Each	5	38,400	192,000
Utility Service	Lift.	1,000	24	24,000
Signs	Each	20	60	1,200
18' Asphalt Dr.	Lift.	10,000	15	150,000
Parking Spaces	Sq. Yd.	16,000	5.50	88,000
Guard Rail	Ft.	20,000	6.00	120,000
Landscaping	Acre	2,400	75	180,000
Miscellaneous			10,000	10,000
			Subtotal	1,296,100
			Contingencies 20%	259,220
			Engineering and Design 10%	129,610
			S&A 10%	129,610
			TOTAL	$1,814,540

PRELIMINARY COST FIGURES

TABLE D_2

RECREATIONAL PACKAGES
EXAMPLES OF FACILITIES AND COSTS INVOLVED

Small Recreation Area	Unit	No. of Units	Unit Costs Dollars	Estimated Amount Dollars
Information Center	Each	1	$ 6,000	$ 6,000
Picnic Unit	Each	20	210	4,200
Playground Facilities	Each	2	1,000	2,000
Landscaping	Acre	10	2,400	24,000
Walkways	L. Ft.	500	10	5,000
Signs	Each	5	60	300
Parking Spaces	Sq. Yd.	2,000	5.50	11,000
Comfort Station	Each	1	42,600	42,600
Miscellaneous			2,000	2,000
			Subtotal	97,100
			Contingencies 20%	19,420
			Engineering and Design 10%	9,710
			Supervision & Admin. 10%	9,710
			TOTAL	$135,940

Linear Development*

*Cost estimate is presented in Table C.

PROPOSED RULE MAKING

.R. 22590/98
. 25, 1971

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

[Docket No. R-71-150]

[24 CFR Parts 511, 541, 551, 561]

PROJECT SELECTION SYSTEM FOR CERTAIN COMMUNITY DEVELOPMENT PROGRAMS

Notice of Proposed Rule Making

Notice is hereby given that the Assistant Secretary for Community Development, under the authority contained in section 7(d) of the Department of Housing and Urban Development Act, 42 U.S.C. 3535(d), is considering the addition of new Parts 511, 541, 551, and 561 to Title 24 of the Code of Federal Regulations, as set forth below.

The proposed new Parts 511, 541, 551, and 561 would assist in the selection of project applications for funding under the Neighborhood Development Program, the Open Space Program (Legacy of Parks), the Neighborhood Facilities Program, and the Public Facility Loans Program.

These are four of seven basic programs now grouped under the umbrella of "Community Development" as part of a Departmental reorganization reflecting a basic change in the operation of the Department in order to subordinate "program" to "purpose."

The Department's purpose, the delivery of essential Community Development resources and assistance to areas of need, without regard to size of the community in the face of demand which exceeds the supply, can be most effectively achieved through use of a rational system which identifies eligible projects which best meet Community Development goals established by this Department.

The Community Development Project Selection Systems will be used to allocate scarce resources and assistance quickly and fairly for the maximum benefit of the hard pressed urban and rural areas of this country. These systems will identify those projects for early funding decisions which do more than the bare minimum needed to qualify an applicant under a particular statute. Priority systems such as these are necessary tools for allocation of resources to those projects which deliver the most to areas of greatest need. In addition these Project Selection Systems further the objective of annual funding. The purpose is to make those decisions fairly, equitably, and openly.

Project applications will be reviewed in the HUD Area Office by a team consisting of appropriate Community Development staff and technical experts.

Funding will be made available only after three distinct review activities occur. First, the application will be judged against statutory related prerequisites to eliminate clearly inappropriate proposals or clearly ineligible projects; second, the application, if it meets the prerequisite test, will be evaluated against certain numerically rated criteria and ranked among all applications for a particular fiscal quarter; third, those applications ranked high enough to justify further processing in accordance with established procedures will then be reviewed for technical compliance with all relevant statutory requirements including those for which a preliminary judgment was made as to apparent eligibility in the prerequisite review. No funding commitments will be made until after these technical compliance reviews are completed.

Staff judgments will be based on information submitted by the applicant as well as information secured from Area Offices/local staff discussion and site visits. At the end of each fiscal quarter all applicants will receive notice as to the status of their application with HUD (either approved contingent on fully meeting statutory requirements, or rejected). This notification will contain an explanation for rejection, in those cases where an application is not approved. Applicants whose projects receive conditional approval will be required to submit any needed technical supplemental information within 60 days or lose the conditional fund assurance.

The numerical ranking process will be used to select those applications which are superior in terms of meeting program goals. Criteria rate the locality's need for the project, and ability to coordinate and carry out the project, as well as rating the project itself.

A positive response on each statement for which points are awarded will result in the awarding of the assigned number of points. In several instances a judgment is called for between "good" and "superior" with the point total differentiated accordingly.

Interested persons are invited to participate in the making of the proposed rule by submitting written data, views, or statements with regard to the proposed regulations. Communications should identify the proposed rule by the above title and should be filed in triplicate with the Rules Docket Clerk, Office of General Counsel, Department of Housing and Urban Development, Washington, D.C. 20410. All relevant material received on or before December 27, 1971, will be considered by the Secretary before taking action on the proposal. Copies of comments submitted will be available during business hours, both before and after the specified closing date, at the above address, for examination by interested persons. Environmental statements concerning the impact of these project selection systems can be purchased from the National Technical Information Service, Department of Commerce, Springfield, Va. 22151.

nined or areawide plan or strategy. Factors taken into consideration may nclude the project's responsiveness to ocal needs and objectives, the economies possible through coordinated or joint action, the degree of support by the appropriate unit(s) of local general-purpose government, and the management capacity within local general-purpose government.

PART 541—OPEN SPACE PROGRAM (LEGACY OF PARKS) PROJECT SELECTION SYSTEM

AUTHORITY: The provisions of this Part 541 issued under title IV, of the Housing Act of 1961, as amended, Public Law 91-609, 84 Stat. 1781; 42 U.S.C. 1500.

§ 541.1 Scope.

(a) *Purpose.* This part sets forth criteria and procedures to be used in preliminary evaluation of applications for Federal grant assistance to local public bodies and agencies for the Open Space Program (Legacy of Parks).

(b) *Procedures.* Submissions will first be reviewed against five prerequisites. If any of these prerequisites are not met, the application will be rejected. If the application meets all prerequisities, it will be evaluated against the point rated criteria and assigned a point rating. The application will then be rejected or processed further according to its point rating as compared with the point ratings of other competing applications. This evaluation will not result in a final decision to extend grant assistance to particular Open Space projects. Such decision will be made only after a full technical review of applications for compliance with all relevant statutory requirements.

§ 541.2 Definitions.

As used in the regulations in this part:

(a) "City Demonstration Agency" means that agency which was required to be established under title I of the Demonstration Cities and Metropolitan Development Act of 1966, 80 Stat. 1255, 42 U.S.C. 3301, to carry out a Model Cities program at the local level.

(b) "Locality" means the political jurisdiction or jurisdictions having general-purpose government powers upon whose behalf the application for funding has been submitted.

(c) "Low and moderate income" means an income level which is less than the maximum income eligibility level for a family of four for the county in which the project is to be located under either of the subsidized housing programs authorized by section 235 or 236 of the National Housing Act, as amended 82 Stat. 476, 477, 498; 12 U.S.C. 1715z, 1715z-1.

(d) "Low- and moderate-income housing" refers to housing with a fair market value that is equal to or less than the resultant of multiplying the section 235-236 maximum income for a family of four, as established by the Secretary for the county in which the project is located, by a factor of 3. "Low- and moderate-income housing" also refers to housing with an annual rental equal to or less than one-third of such section 235-236 maximum income.

(e) "Model neighborhood" means that geographical area in which funds are being spent under a program authorized by title I of the Demonstration Cities and Metropolitan Development Act of 1966, 80 Stat. 1255, 42 U.S.C. 3301.

§ 541.4 Program prerequisites.

For the Open Space Program (Legacy of Parks) there are the following five prerequisites:

(a) Certified areawide planning jurisdiction. The locality is in a certified areawide planning jurisdiction. For definition of "certified areawide planning jurisdiction" see HUD Circular 6415.1A and 6415.3.

(b) *Civil rights.* Submission of acceptable assurances of compliance with title VI of the Civil Rights Act of 1964, Public Law 88-352, 78 Stat. 252, 42 U.S.C. 2000d and HUD title VI regulations 24 CFR Part I, 29 F.R. 16280 and with affirmative action plan requirements pursuant to Executive Order 11246, as amended 30 F.R. 12319, and HUD regulations 24 CFR Part 8, 36 F.R. 20688.

(c) *Relocation.* Absence of any known impediment to the locality's ability to meet relocation requirements.

"Known impediment" refers to both a legal inability to comply with title I of the Housing Act of 1949, as amended, Public Law 81-171; 63 Stat. 413, 414, 42 U.S.C., 1450, or the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, 84 Stat. 1894, 42 U.S.C. 4601, or other statutory requirements and a practical inability to provide adequate relocation assistance.

(d) *A-95 coordination.* Evidence that A-95 coordination is in process. The phrase "A-95 coordination" refers to the procedure involving review of applications by the appropriate agency designated under OMB Circular A-95.

(e) *National Register of Historic Places.* For historic and architectural preservation assistance the project must involve property or open space land which is listed on the National Register of Historic Places. The "National Register of Historic Places" is a record of culturally significant property maintained by the National Park Service, U.S. Department of the Interior. See section 106 of the Historic Preservation Act of 1966, Public Law 89-665, 80 Stat. 915; 16 U.S.C. 470.

§ 541.6 Criteria for evaluating applications.

Criteria for evaluating applications are divided into the following major categories:

(a) Local effort and coordination;

(b) Projects ability to meet open space needs;

(c) Local equal employment effort;

(d) Local need;

(e) Commitment of local, State, and Federal entities to project or program;

(f) Expansion of housing for low- and moderate-income families;

(g) Community development.

The elements considered in each category are described in the following sections, and the method of assigning rating points to each element or category is set forth. Points are awarded to each element or category in the following manner unless otherwise specifically indicated. If a statement under a particular element or category applies specifically to the project application under consideration, the application is awarded the number of points assigned to that statement. If no statement applies, no points are awarded to the application for that element.

§ 541.8 Local effort and coordination.

(The value of this category is the sum of the values of paragraphs (a) to (d) of this section.)

(a) *Budget and capital improvement plan.* All necessary project related public improvements, facilities, and services are identified in the appropriate local budgets and capital improvement plan, except those included in projects costs 4

(b) *Model Cities.* The project area in whole or in part is in a Model Neighborhood and there exists a statement by the City Demonstration Agency Director that the activities for which funding is requested are consistent with the goals and objectives of the Model Neighborhood's plan........................... 3

(c) *Local regulatory measures.* The project is coordinated with other programs and regulations to improve the quality of the environment, as evidenced by the fact that the locality has adopted and is enforcing regulatory measures to reduce blight and decay and to preserve and promote open space and historic resources at minimum cost. These regulatory measures must include at least three of the following:

(1) Requirements for undergrounding of utilities;

(2) Adoption and enforcement of litter control, weed abatement, or sign control;

(3) Subdivision regulations requiring open space dedication;

(4) Cluster zoning or planned unit developments; "Cluster Zoning or Planned Unit Development" are regulations enacted by the locality that encourage the grouping and placement of structures in such a manner as to create or reserve open space.

(5) Relaxation of set-back and height controls to provide Open Space in core areas;

(6) Ordinances to protect historic es and buildings 6

(d) *Low- and moderate-income hous-*
y. The project is related to and co-
dinated with the provision of low- and
oderate-income housing 4

541.10 Projects ability to meet open space needs.

(The value of this category is the sum paragraphs (a) to (f) of this section.)

(a) *Environment.* Effect on the en-
onment (The value of this section is
e sum of subparagraphs (1) to (6) of
is paragraph.)

(1) The project will prevent or remedy ban blight or deterioration 2

(2) The project will help curb urban rawl or prevent incompatible develop-
ent 2

Urban sprawl" refers to random and guided development outward from ban centers. It is usually character-
d by groups of large scale, low density sidential development, interspersed and rrounded by commercial and indus-
al development. Projects that can help eviate and curb urban sprawl are proj-
ts designed to guide large scale growth, act as a buffer by separating existing nd uses. "Incompatible development" fers to undesirable and hazardous de-
lopment of flood plains, steep slopes, ults, or any other similarly unsuited ea.

(3) The project will remedy defi-
ency of open space 2

Deficiency of Open Space" means that ere is less than 2.5 acres of existing blic open space per thousand popula-
n.

(4) The project preserves ecologically gnificant areas or conserves scenic eas 1

Ecologically significant" refers to un-
ual, specific, resource-oriented open ace areas such as wildlife sanctuaries, ysers, waterfalls, wet lands, and sand ines.

(5) The project involves more than e type of environmental improvement tivity 1

Environmental improvements" are ose development activities, excluding rk development, designed to improve e overall appearance of a locality or ighborhood. These activities are de-
gned to prevent community blight and cay, and can include street tree plant-
g, redesigning street furniture, and proving pathways.

(b) *Population served.* The project ll readily serve a substantial number low and moderate income residents .. 7

(c) *Patterns of urban growth.* The oject involves undeveloped or predom-
ately undeveloped land which, if with-
ld from commercial, industrial, and sidential development, would have spe-
al significance in helping to shape de-
able patterns of urban growth 5

(d) *Danger of loss.* The project site in imminent danger of loss 3

mminent Danger of Loss" means that e project is threatened by action which ll prevent the use of the area or prop-
erty for open space or historic preser-
vation purposes.

(e) *Historic preservation.* The project is a historic building involving an adap-
tive use such as community center, sen-
ior center, information center, citizen's meeting hall, or any such use that meets a specific need in the community it serves 2

(f) *Program experience.* If applicant had previous federally assisted program experience:

The applicant has expeditiously acquired and developed properties, sponsors programs for its use, and operates them in accordance with contract conditions 5

or

If the applicant is without federally as-
sisted program experience:

The applicant has well maintained public open spaces, sponsors programs for their use, and operates those programs in a nondis-
criminatory manner 5

§ 541.12 Local equal employment and entrepreneurial effort.

(The value of this category is the sum of the values of either paragraphs (a) or (b) of this section.)

(a) *If locality has had previous fed-*
erally assisted open space experience. (Value of this element is the sum of the values of subparagraphs (1) to (3) of this paragraph.)

(1) All activities undertaken by the locality have provided relatively superior opportunities for training and/or em-
ployment, of minority persons 3

(2) All activities undertaken by the locality have provided relatively superior opportunities for business concerns owned, controlled, or managed in sub-
stantial part by minority persons 3

(3) The applicant has taken affirma-
tive action in its own employment in the hiring, training, etc., of minority per-
sons, with relatively superior results .. 4

(b) If locality has not had previous federally assisted open space experience: (Value of this element is the sum of the values of subparagraphs (1) and (2) of this paragraph.)

(1) Activities undertaken by the lo-
cality have provided relatively superior opportunities for training and/or em-
ployment of minority persons 5

(2) Activities undertaken by the lo-
cality have provided relatively superior opportunities for business concerns owned, controlled, or managed in sub-
stantial part by minority persons. In determining whether or not performance has been "relatively superior", the follow-
ing items will be taken into considera-
tion: Absolute numbers of persons actu-
ally trained or hired in relation to num-
bers of minority group persons in the labor market area; total dollar value of contracts let to minority entrepreneurs in relation to total dollar amount of con-
tracts let by locality; within the adminis-
tering agency, racial composition at all levels of employment and absolute num-
ber of training opportunities made avail-
able to minority group persons 5

§ 541.14 Local need.

(The value of this category is the sum of the values of paragraphs (a) and (b) of this section.)

(a) *Median income of jurisdiction.* The median annual family income of the geographic area of jurisdiction of the applicant compared to the State median annual family income is: (Select one, if appropriate):

(1) $1–$500 below State median 4

(2) more than $500 below State me-
dian 8

(b) *Median income of service area.* The median annual family income of the service area compared to the State an-
nual median family income is: (Select one if appropriate):

(1) $1–$500 below State median 4

(2) more than $500 below State me-
dian 8

Median family incomes for the service area and the State are to be obtained by utilizing the City County Data Book or other census data if possible. Or use best available data.

§ 541.16 Commitment of local, State, and Federal entities to project or program.

(The value of this category is the sum of paragraphs (a) to (d) of this section.)

(a) *Local commitment.* There was substantial participation by the chief executive and local governing body dur-
ing the planning of the project, and they are demonstrating current public com-
mitment in support of the project 4

(b) *Resident commitment.* There was effective widespread participation of a representative spectrum of residents in the development of project objectives and there is evidence of current support for the execution of the project 4

(c) *Coordination of resources.* There was substantial participation of other local agencies during planning, and there is a current commitment including resources, from State, county, or local entities other than those necessary to satisfy the local share requirement 4

(d) *Participation in areawide or metropolitan planning.* There is active participation by the locality's representa-
tives in the areawide or metropolitan planning organization 3

§ 541.18 Expansion of housing for low- and moderate-income families.

(The value of this category is the sum of paragraphs (a) and (b) of this sec-
tion.)

(a) *Expansion of low- and moderate-*
income housing. Within the applicant's geographic area of jurisdiction, there has been significant expansion of the supply of standard housing for low- and moderate-income families in a nondis-
criminatory way 6

(b) *Dispersion of low- and moderate-*
income housing. The locality has a real-
istic plan to expand the supply of stand-
ard low- and moderate-income housing in a nondiscriminatory way outside areas of concentration of economically dis-
advantaged or minority citizens 4

§ 541.20 Community development.

The degree to which the project is necessary for undertaking other publicly supported community development ac-
tivities .... 0 to 4

"Community development activities" re-

fers to those publicly supported physical development activities and those related social or economic development activities being carried out or to be carried out within a reasonable period of time in accordance with a locally determined or areawide plan or strategy. Factors taken into consideration may include the project's responsiveness to local needs and objectives, the economies possible through coordinated or joint action, the degree of support by the appropriate unit(s) of local general-purpose government, and the management capacity and efforts to develop management capacity within local general-purpose government.

PART 551—NEIGHBORHOOD FACILITIES PROGRAM PROJECT SELECTION SYSTEM

AUTHORITY: The provisions of this Part 551 issued under sec. 703, of the Housing and Urban Development Act of 1965, 79 Stat. 491; 42 U.S.C. 3103.

551.1 Scope.

(a) *Purpose.* This part sets forth cri-ria and procedures to be used in pre-minary evaluation of applications for ederal grant assistance to local public odies and agencies for Neighborhood acilities Grant Projects.

(b) *Procedures.* Submissions will first e reviewed against five prerequisites. any of these prerequisites are not met, ie application will be rejected. If the plication meets all prerequisites, it will evaluated against the point rated cri-ria and assigned a point rating. The plication will then be rejected or proc-sed further according to its point rating compared with the point ratings of her competing applications. This eval-tion will not result in a final decision extend grant assistance to particular ighborhood Facilities projects. Such cision will be made only after a full chnical review of applications for com-ance with all relevant statutory quirements.

551.2 Definitions.

As used in the regulations in this part:

(a) "Locality" means the political isdiction or jurisdictions having gen-l-purpose government powers upon ose behalf the application for fund-has been submitted.

(b) "Low and moderate Income" means an income level which is less than the maximum income eligibility level for a family of four for the county in which the project is to be located under either of the subsidized housing programs authorized by section 235 or 236 of the National Housing Act, as amended, 82 Stat. 476, 477, 498, 12 U.S.C. 1715Z, 1715Z-1.

(c) "Low- and Moderate-Income Housing" refers to housing with a fair market value that is equal to or less than the resultant of multiplying the section 235-236 maximum income for a family of four, as established by the Secretary, for the county in which the project is located, by a factor of 3. "Low- and Moderate-Income Housing" also refers to housing with an annual rental equal to or less than one-third of such section 235-236 maximum income.

§ 551.4 Program prerequisites.

For the Neighborhood Facilities Grant Program there are the following five prerequisites:

(a) *Relocation.* Absence of any known impediment to the locality's ability to meet relocation requirements.

"Known impediment" refers to both a legal inability to comply with title I, Housing Act of 1949, as amended, Public Law 81-171; 63 Stat. 413, 414, 42 U.S.C. 1450, or the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, 84 Stat. 1894, 42 U.S.C. 4601, or other statutory requirements and a practical inability to provide adequate relocation assistance.

(b) *Civil rights.* Submission of acceptable assurances of compliance with title VI of the Civil Rights Act of 1964, Public Law 88-352, 78 Stat. 252, 42 U.S.C. 2000d and HUD Title VI regulations 24 CFR Part I, 29 F.R. 16280 and with affirmative action plan requirements pursuant to *Executive Order 11246, as amended 30* F.R. 12319, and HUD regulations 24 CFR Part 8, 36 F.R. 20683.

(c) *Area to be served.* The area to be served by the facility is reasonable in relationship to the services to be provided, and the design and capacity of the proposed facility.

(d) *Project location.* The project is so located as to be available for use by a significant portion (or number in the case of large urban places) of the area's low- and moderate-income residents.

§ 551.6 Criteria for evaluating applications.

Criteria for evaluating applications are divided into the following major categories:

(a) Relationship to comprehensive planning;

(b) Income level of area to be served;

(c) Relevance of program objectives;

(d) Capacity to administer the neighborhood facility;

(e) Local equal employment effort;

(f) Local need;

(g) Commitment of local, State, and Federal entities to project or program;

(h) Expansion of housing for low- and moderate-income families;

(i) Community development;

The elements considered in each category are described in the following sections, and the method of assigning rating points to each element or category is set forth. Points are awarded to each element or category in the following manner unless otherwise specifically indicated: If a statement under a particular element or category applies specifically to the project application under consideration, the application is awarded the number of points assigned to that statement. If no statement applies, no points are awarded to the application for that element.

§ 551.8 Relationship to comprehensive planning.

(The value of this category is the value of paragraph (a)).

(a) *General plan.* The proposed facility is specifically identified in the locality's general plan __________________ 5

§ 551.10 Income level of area to be served.

(The value of this category is the value of paragraphs (a), (b), or (c) of this section, as applicable.)

(a) *Population served.* On the basis of 1970 Census data, 40-49 percent of the families whose needs are proposed to be served by the facility are low- and moderate-income families__________ 5

"Low- and moderate-income" is defined in § 551.2(b).

(b) *Population served.* On the basis of 1970 Census data, 50-59 percent of the families whose needs are proposed to be served by the facility are low- and moderate-income families__________ 10

(c) *Population served.* On the basis of 1970 Census data, 60 percent or over of the families whose needs are proposed to be served by the facility are low- and moderate-income families__________ 14

§ 551.12 Relevance of program objectives.

(The value of this category is the sum of paragraphs (a) to (c) in this section.)

(a) *Accessibility to low- and moderate-income persons.* The proposed facility will be made readily accessible to low- and moderate-income persons outside the immediate neighborhood_____ 3

(b) *Provision of community service.* The proposed facility will provide a program of community services to meet identified needs of low- and moderate-income families and individuals where present service and facilities do not exist ________________________________ 8

(c) *Coordination of existing services.* The proposed Neighborhood Facility Program will coordinate and extend existing health, recreation, social or similar community services to meet the identified needs of the population of the area to be served________________________ 5

"Identified Needs" refer to those priority needs determined by the applicant with the participation of the community residents whose needs are to be served.

§ 551.14 Capacity to administer the Neighborhood Facility.

(The value of this category is the sum of paragraphs (a) and (b) of this section.)

CONSERVATION NEED INVENTORY FOR THE NORTH BRANCH OF THE CHICAGO RIVER

The following need inventory summarizes problem areas and suggested improvements for the North Branch of the Chicago River. Dr. Snarr, Vice-Chairman of our Conservation Advisory Committee, suggested using the North Branch as a model of the planning input we would like from our Committee. The problem areas and suggested improvements were identified for us by a representative sample of conservationists in the drainage area of the North Branch. We sent out questionnaires to citizens that Dr. Snarr felt could and would respond as soon as possible. A copy of the questionnaire with attached letter follows. Dr. Snarr also completed 35 questionnaire forms and distributed 40 others. Since we are operating under severe time restrictions, only those forms returned to us by 19 May 1972 have been incorporated. A total of 41 questionnaires were returned out of 130 distributed. The response, although limited to a small number of individuals, comes from people with intensive knowledge of the local area, hence it reflects the problems and desires of a much larger number. The opinions presented herein do not necessarily represent the opinions of the Chicago District, U. S. Army Corps of Engineers.

INTRODUCTION

In order to organize questionnaire responses it is necessary to be site specific, both in verbal summary and on graphics. The starting point for the summary is the confluence of the North Branch with the North Shore Channel, followed by the main fork of the North Branch, the West Fork, the East Fork,

and the Skokie River. The following tables indicate location, present usage, existing problems, improvements suggested, and projected usage (in priority ranking).

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT. CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO. ILLINOIS 60604

NCCPD-RL

26 April 1972

Dear Conservation Friend,

To identify areas of conservation concern, the Army Corps of Engineers requires assistance with the enclosed questionnaire.

Information obtained with the questionnaire will be used by the Corps in its Chicago-South End of Lake Michigan Study. The purpose of the study is to consider alternatives for management of waterways in the study area shown on the map also enclosed.

A second phase of the study, now under way, is scheduled for completion early in 1973. To advise the Corps where conservation measures should be taken and where recreational uses should be provided, a Citizen's Advisory Committee for Conservation has been organized.

The Advisory Committee urges all individuals and organizations who share its concern to circulate the questionnaire among its members. June 1 is the deadline for return of the questionnaire to:

DEPARTMENT OF THE ARMY
Chicago District Corps of Engineers
219 South Dearborn Street
Chicago Illinois 60604

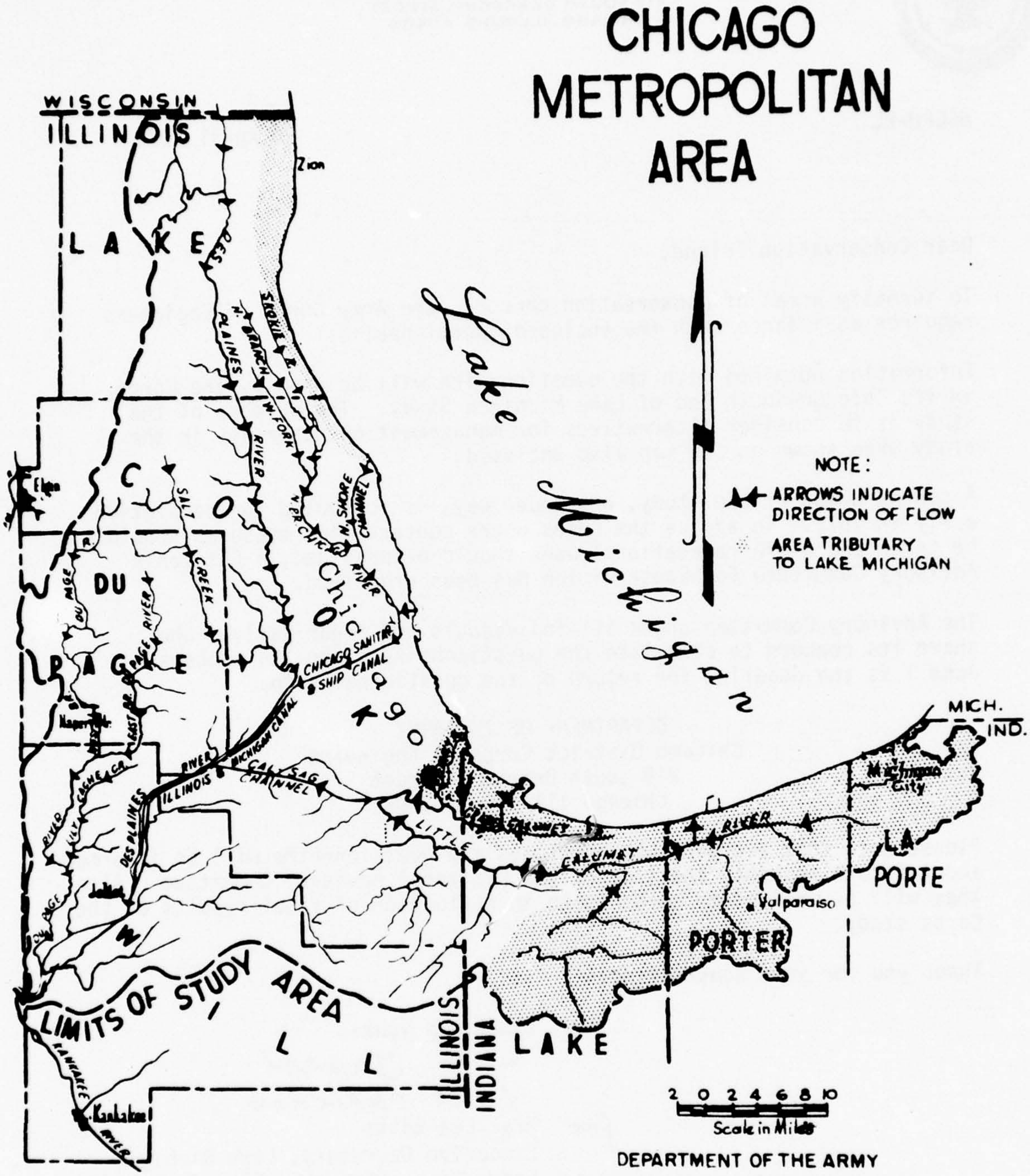
Please note that everyone who completes the questionnaire will be informed about future workshop meetings of the Citizens' Advisory Committee. Also they will be invited to participate in evaluation of final results of the Corps study.

Thank you for your cooperation.

Sincerely yours,

J. F. Snarr
VICE CHAIRMAN

for Mrs. Lee Botts
Executive Secretary, Lake Michigan
Federation, Chairman, Citizens' Advisory
Committee for Conservation
Chicago-South End of Lake Michigan Waste-
water Management Study



DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS

Conservation Inventory and Needs

The purpose of this questionnaire is to provide input for the Corps of Engineers, Chicago District's wastewater management study. The questionnaire is designed to determine what types of conservation and recreational programs should be considered for specific locations within the study area. See attached map. A separate questionnaire should be completed for each location involving the natural features and recreational usages you recommend. The questionnaire together with any additional comments should be forwarded to the District Engineer, U. S. Army Corps of Engineers, Chicago District, 219 South Dearborn Street, Chicago, Illinois, 60604 where more copies also can be obtained.

To provide for a follow-up contact by the Corps during its study please fill out the following:

Name (Individual or Organization):________________________________

Address:____________________ ____________________

Telephone No.: (home)____ - ________ (office)____ - ________ ext.____

A. Desired Land Conservation Programs. (One form per site please)

1. Site Location:________________________________
2. Projected Usage (check usage(s) you recommend):
   a. Purpose for preservation:
      i. aesthetics........................______
      ii. historical........................______
      iii. wildlife management...............______
   b. Potential recreational usage (specify)________________
   ____
   c. Other possible uses (specify)________________
   ____
3. Required acreage________________________________
4. Current land usage________________________________
____

B. Desired Stream Improvement Programs: (one form per stream please)

1. Stream name:________________________________
2. Stretch of stream involved:______________ to ______________
3. Present usage:________________________________
4. Projected usage (indicate priority ranking):________________
____
5. Existing problems (check where applicable):
   a. Poor water quality.......................______
   b. Algae growth.............................______
   c. Siltation................................______
   d. Flooding.................................______
   e. Debris (natural or man-made).............______
   f. Bank erosion.............................______
   g. Fishery population: (indicate species)
      i. excellent to good ________ ________ ________
      ii. good to fair ________ ________ ________
      iii. poor ________ ________ ________

- OVER -

6. Is flow adequate during recreational season (May thru Oct.)?
   Yes ______ No ______
7. Possible in-stream improvements that should be considered (per stream; stream reach location).
   i. low-water dams ______
   ii. riffles ______
   iii. wing deflectors ______
   iv. deep pool (excavations) ______
   v. beaches ______
   vi. bank fishing sites ______
   vii. boat launching/take-out points (float trips) ______
   ______
   viii. stream use zoning ______
   ix. related planting programs ______
   x. other (specify) ______
   ______

C. Other Programs.

1. Existing impoundments/lagoons:
   a. Clean-out (indicate type of problem) ______
   ______
   b. Improvement of water quality (indicate type of problem)
   ______
   ______
   c. Enlarge capacity ______
   ______
2. Recommended new improvements:
   a. Location and size (acres) ______
   ______
   b. Proposed usage ______
   ______

D. Other Comments: ______
______
______
______
______
______
______
______

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
Confluence North Branch of Chicago River with North Shore Channel	Primarily sewage effl. carrier	Poor quality water Dam in disrepair	Either repair dam or replace with wing deflectors (to give less dangerous drop) If dam remains a portage facility should be provided for small craft continuing down the channel.	Small Boat Portage Continuous small craft movement without Portage
(Main Fork) North Branch from confluence to Albany Street	Primarily sewage effl. carrier	Poor quality water Crumbling revetments Poor quality fishery	Flow augmentation bank fishing sites plant water plants for habitat repair revetments walkway on south side beautification planting park-playground picnic area	Fishing Hiking Play
(Main Fork) North Branch at Albany Ave Bridge (Northwest Bank) - Albany to Troy	Primarily sewage effl. carrier	Poor quality water Crumbling revetments Poor quality fishery	Hiking trail begun in previous section should be extended across bridge and along North Bank replace revetments or cover with vines canoe take-out bank fishing sites flow augmentation	Fishing Hiking Picnic Canoe take-out

Page 1

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK
(Main Fork) North Branch from Troy Ave. to Kedzie	Primarily sewage effl. carrier	Poor quality water No fishery Inadequate flow during recreational season	Extend trail along North Bank, around the brick building at alley and up steps to Kedzie bank fishing sites beautification planting	Hiking Fishing Boating
(Main Fork) North Branch from Kedzie to Kimball	North Park College on the north bank Primarily sewage effl. carrier	Poor quality water No fishery Inadequate flow during recreational season	Extend trail either: (1) along North Bank through campus and on to Kimball (2) across bridge, then along Carmen Ave. to Spaulding St. footbridge then cross to North Bank and continue trail to Kimball	Hiking Fishing Boating Walking
(Main Fork) North Branch from Kimball to Bernard	Primarily sewage effl. carrier	Poor quality water Poor quality fishery Revetments collapsing Inadequate flow during recreational season	revetment construction footbridge at Bernard beautification planting Extend trail along side streets on south bank to Bernard St. footbridge bridge fishing sites	Hiking Boating Fishing

Page 2

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.O.)	PROJECTED USE (PRIORITY RANK)
(Main Fork) North Branch-Bernard to St. Louis	None	Poor quality water Revetments collapsing No fishery Inadequate flow during recreational season	Repair revetments Extend trail along top of north bank to St. Louis beautification planting bank fishing sites	Walking trail Hiking Fishing Boating Esthetics
(Main Fork) North Branch from St. Louis to Drake (north bank)	None	Poor quality water Revetments collapsing No fishery Inadequate flow during the recreational season	Acquire plot of land along North Bank to install picnic-park beautification planting bank fishing sites repair revetments	Neighborhood picnic area Hiking Fishing Boating
(Main Fork) North Branch from Drake to Central Park	None	Poor quality water Revetments collapsing No fishery Inadequate flow during the recreational season	Extend trail along North Bank and possibly through apartment parking area or atop reconstructed bank bank fishing sites beautification planting	Neighborhood picnic area Fishing Boating

Page 3

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
(Main Fork) North Branch from Central Park to Monticello	None	Poor quality water Revetments bad No fishery Inadequate flow during recreational season	Extend previous trail along side streets on North BAnk to Monticello---unless bank can be constructed to support trail. bank fishing sites beautification planting	Fishing Hiking Boating
(Main-Fork) North Branch from Monticello to Lawndale	None	Poor quality water Revetments collapsing No fishery Inadequate flow during recreational season	Extend trail along the north bank from Monticello to Eugene Field Park beautification planting bank fishing sites	Hiking Fishing Boating
(Main Fork) North Branch from Lawndale to Foster	Eugene Field Park of Chicago Park District	Poor quality water Inadequate flow during recreational season	Realization of existing city park potential with river oriented recreational programs bank fishing sites boat launching point	Fishing Ice skating Boating Walking Fishing and Boating Lessons (from Park District)

Page 4

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
(Main Fork) North Branch from Foster to Pulaski	None	Poor quality water Poor fishery	Riverside hiking trail would have to be extended along Foster Street because of cemetary immediately adjacent to stream bank fishing sites	Boating Fishing
(Main Fork) North Branch from Pulaski to LaBagh Woods	Gompers Park, Chicago Park District	Poor quality water No fishery Inadequate flow during recreational season	Hiking trail should extend all the way to Labagh woods boat launching site bank fishing sites Extended river oriented recreational & educational programs	Hiking Fishing Boating Ice skating
(Main Fork) North Branch from LaBagh woods to Forest Glen Ave.	Forest Preserve Dist. Page 5	Poor quality water No fishery Inadequate flow during recreational season	(Hiking trail on south side of river now in existence)	Boating Fishing Hiking Nature study Wildlife Birding Photography

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (in addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
(Main Fork) North Branch from Forest Glen Ave. northward	Forest Pres. Dist.	Ground cover non-existant around bridge (worn) Poor quality water Algae growth in low water Siltation No fishery Inadequate flow during recreational season	no suggestions	Fishing Boating Hiking
(Main Fork) North Branch from Forest Glen to Whelan pool	Forest Pres. Dist. with golf course	Inadequate flow Poor quality water Algae growth Siltation Natural and Man-made debris Bank erosion Poor quality fishery	Manage use of picnic areas to prevent stripping of vegetative cover Boat launching at Whelan Pool parking lot	Boating Fishing Swimming
(Main Fork) North Branch from Whelan Pool to Harts Road (3 acres on the west side of river)	Forest Pres. Dist. (Dump and Service area for cemetary across Milwaukee Ave.)	No fishery Poor quality water algae growth Natural and Man-made debris Bank erosion and cement revetments collapsing Inadequate flow during recreational season	Planting to protect slope Clear up debris in river and on banks, including cement piers from former bridges Could be acceptable location for Niles Civic Center-(Historical Soc. & Women's Club)	Full regime of recreational and educational uses

Page 6

LOCATION	PRESENT USE	EXISTING PROBLEMS	(In addition to W.Q.) SUGGESTED IMPROVEMENT	PROJECTED USE (PRIORITY RANK)
(Main Fork) North Branch from Harts Road to Touhy	Forest Pres. Dist.	Poor quality water algae growth Bank Erosion No fishery Inadequate flow during the recreational season	Planting programs for bank protection and retention	Full regime of recreational and educational uses
(Main Fork) North Branch from Touhy to Howard	Forest Pres. Dist. + Niles Park District landfill	use of flood plain for land fill is bad Poor quality water Algae growth Siltation Flooding Bank erosion No fishery Inadequate flow - rec.	Remove landfill so that flood plain is restored Planting program to shield industrial area on east bank wing deflectors in place of dam below Howard St. Bank fishing sites	Fishing and Boating classes by the Niles Park District as a priority
(Main Fork) North Branch from Howard to Caldwell	Golf course, F.P.D., Commercial	No fishery Poor quality water Algae growth Siltation Flooding Some debris Bank Erosion	Planting program and fencing to prevent the parking lot litter from reaching river bank County or State should acquire golf course plus land on easement on east bank to shield course from commercial development planned. Niles Park Dist. has option to purchase course but is not geared to operate golf course.	Current use Boating Fishing

Page 7

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENTS (In addition to W.Q.)	PROJECTED USE (PRI ITY RANK)
(Main Fork) North Branch from Caldwell to Oakton	Industrial Floodplain	Poor quality water Algae growth Litter Bank erosion. No fishery Inadequate flow during recreational season	Bank fishing sites Need fence along warehouse parking lot to keep litter off bank of river Planting program to beautify fill on east bank adjacent to warehouse	Fishing Boating
(Main Fork) North Branch from Oakton to Dempster	Forest Pres. Dist.	Ditch along Lincoln Ave is receptacle for junk Poor quality water Algae growth Debris Bank erosion No fishery Inadequate flow during recreational season	Planting for Beautification Boat launching point Bank fishing sites	Full regime of water related activities
(Main Fork) North Branch Dempster to Beckwith	Forest Pres. Dist.	Poor quality water algae growth Bank erosion No fishery Inadequate flow during recreational season	Boat launching site adjacent to Beckwith Rd.	Full regime of water related activities

Page 8

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
(West Fork) North Branch from Beckwith to Golf Rd.	Golf Course - F.P.D.	Poor quality water Algae growth Natural debris No fishery Inadequate flow during recreational season	no suggestions	Golf course as is Forested areas Fishing Canoeing
(West Fork) North Branch from Golf Rd. to Riverside Park	Private golf course plus residences	Inadequate flow during recreational season Poor quality water Algae growth Siltation Flooding Man-made debris No fishery	Hiking trail along the west side for part of this segment. Residential nature of the area would make this difficult. Trail start at Long Valley Road and extend to Riverside park.	Same uses as present Fishing Wading Swimming Boating Ice skating
(West Fork) North Branch from Riverside Park to Waukegan Road	Residential + light industrial	Inadequate flow during recreational season Poor quality water algae growth Siltation Flooding Debris No fishery	Pier one parking lot needs fence and planting at parking lot to keep litter away Construct hiking trail on west bank from Park upstream behind Nat. Dairy Co. to merge with West Fork Green in next section	Fishing Boating Swimming Skating Hiking Nature Trail

Page 9

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.O.)	PROJECTED USE (PRIORITY RANK)
(West Fork) North Branch from Waukegan Rd. to Grove	Commercial	Inadequate flow-rec. Poor quality fishery Poor quality water Algae growth Siltation Flooding Debris Bank erosion	Planting program Bank fishing sites Comment: Concept of this downtown area as the "West Fork Green" was incorporated into the Glenview Village Plans in late 1971. Object is to develop a park-like mall along the river bank. Need fence to prevent parking lot litter-to river	West Fork Green, a village Commons
(West Fork) North Branch from Grove to Sleepy Hollow Park	Residential	Inadequate flow during recreational season Poor quality water Algae growth Siltation Flooding Debris Bank erosion	Revetment improvements Planting programs Bank fishing sites	Continuation of West Fork Green
(West Fork) North Branch from Sleepy Hollow Park to Chestnut	Residential	Inadequate flow during recreational season Poor quality water Algae growth Siltation Flooding Bank erosion Poor quality fishery	Revetment improvements	Fishing Boating Skating

Page 10

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
(West Fork) North Branch Chestnut to Willow Rd.	Residential Commercial Trailer park Vacant	Poor quality water Siltation Bank erosion Poor quality fishery	Boat launching point at Chestnut (West Lake) Planting program to achieve bank stabilization Preserve vacant land for Flood plain Possible location for a small reservoir (50 a)	None indicated
(West Fork) North Branch Willow Rd. to Techny Rd.	Sanitary landfill farmland Flood plain (Catholic Church owned)	None indicated except inadequate flow during recreational season	Deep pool excavation for retention reservoir bank fishing sites	Flood plain Forest Preserve
(East Fork) North Branch from Beckwith Rd. on the Main Fork to Lake St.	Forest Preserve Dist.	Inadequate flow during recreational season Poor quality water Algae growth Bank erosion Poor quality fishery e.g. carp	Footbridge-dam at Beckwith is a dangerous location for a portage. It is directly below a golf course tee. Some redesign of dam-bridge is needed to provide a quicker portage for canoes or perhaps a wing deflector instead of a dam. Perhaps a notch in the dam is all that is needed--to canoe travel	Forest Pres. Dist. Motorless boating Fishing

H-III-4-45

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
(East Fork) North Branch from Lake St. to Happ Road	Golf Course, owned by Northwestern University who wishes to sell for high profit to residential developer Forest Preserve Dist.	Poor quality water Algae growth Poor fishery--carp Inadequate flow during recreational season	Golf course should go to public ownership	Golf course Forest Pres. Motorless boating Fishing
(East Fork) North Branch from Happ Rd. to Willow Rd. Dam	Canoeing Wildlife habitat Forest Pres. Dist.	Poor quality water Algae growth Poor fishery--carp Inadequate flow during recreational season	Boat launching point at Willow Rd. dam	Forest Pres. Wildlife habitat Canoeing
(West Fork) North Branch in Morton Grove	Sewerage Flood water run-off Junkyard	Bank erosion Poor quality water Algae growth Siltation Flooding (small problem) Natural and Man-made debris Poor quality fish--carp	Low-water dam possible Deep pool excavation would be a good idea Bank fishing sites Canoe launching point Recreational zoning Restore eroded bank Increase water flow	Recreation Scenic enjoyment Collect rain water runoff

Page 12

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
(West Fork) North Branch Glenview, Ill. County Line Rd. to Dempster Rd.	None	Bank erosion Fair water quality Algae growth during the summer when water is low Siltation during heavy rains Flooding in certain areas Debris Inadequate flow--rec.	Low water dam Riffles Wingdeflectors Deep pool excavation Bank fishing sites Boat launching site Planting to prevent bank erosion	Fishing Canoeing Picnic area Swimming
(West Fork) North Branch within the Village of Glenview	None	Poor quality water Algae growth Siltation Flooding Debris No fishery	Low water dam to develop fishing, boating Deep pool for fishing Beaches for aesthetic purposes Bank fishing sites Boat launching point restricted to canoes	Fishing Boating
(East Fork) North Branch Skokie Lagoons from top to bottom	Receives effluent from NSSD Recreation	Poor quality water Algae growth Siltation Poor fishery Debris	Stream use zoning	Passive recreation Fishing Canoeing

Page 13

LOCATION	PRESENT USE	EXISTING PROBLEMS	SUGGESTED IMPROVEMENT (In addition to W.Q.)	PROJECTED USE (PRIORITY RANK)
Skokie River Skokie Lagoons to Dempster St.	Storm water drainage Sewage overflow reception	Poor quality water Inadequate flow--Rec. Algae growth Siltation Flooding Debris Bank erosion Good carp and goldfish fish populations, poor bass and bluegill	Planting programs Low water dams Riffles Wing deflectors Deep pool excavation and clean out sediments Bank fishing sites Stream use zoning No development-wild areas	Recreational Educational Aesthetic

Page 14

QUESTIONNAIRE RESULTS
CONSERVATION NEED INVENTORY
NORTH BRANCH OF THE CHICAGO RIVER

PROBLEM INDICATED	No.	SUGGESTED IMPROVEMENT	No.
Poor water quality	41	Improved waste treatment	--
Dam in disrepair (one location)	1	Repair dam or replace with wing deflector	1
Crumbling Revetments (nine locations)	9	Repair or Replace	8
		Cover with vines	1
Poor quality fishery	13	Grow water plants for habitat	1
No fishery	21		
Good fishery-carp	1	Flow augmentation	--
Inadequate flow during recreational season	30	Flow augmentation	--
		Planting to encourage scouring action	--
Bank erosion	15	Planting to prevent erosion	6
(Poor Access)	20	Bank Fishing sites	20
	1	Bridge Fishing site	1
	11	Boat launching and Take/out	11
(Ignoring river as a resource)	--	Public awareness of the value of a stream	--
Litter, Natural and Man-made debris	8	Clean-up	1
		Planting and fencing	3
(Esthetic quality)	11	Beautification planting	11
	1	Beaches	1
(Lack of facilities)	2	Boat portage	2
	11	Trails or walkways	11
	1	Park-playground	1
	3	Picnic areas	3
	1	Footbridge	1
	2	Acquire land	2
	2	Stream-use zoning	2
PROBLEMS INDICATED (Categories)	205 (11)	SUGGESTED IMPROVEMENTS (categories)	87 (19)

MOST OBVIOUS PROBLEMS INDICATED

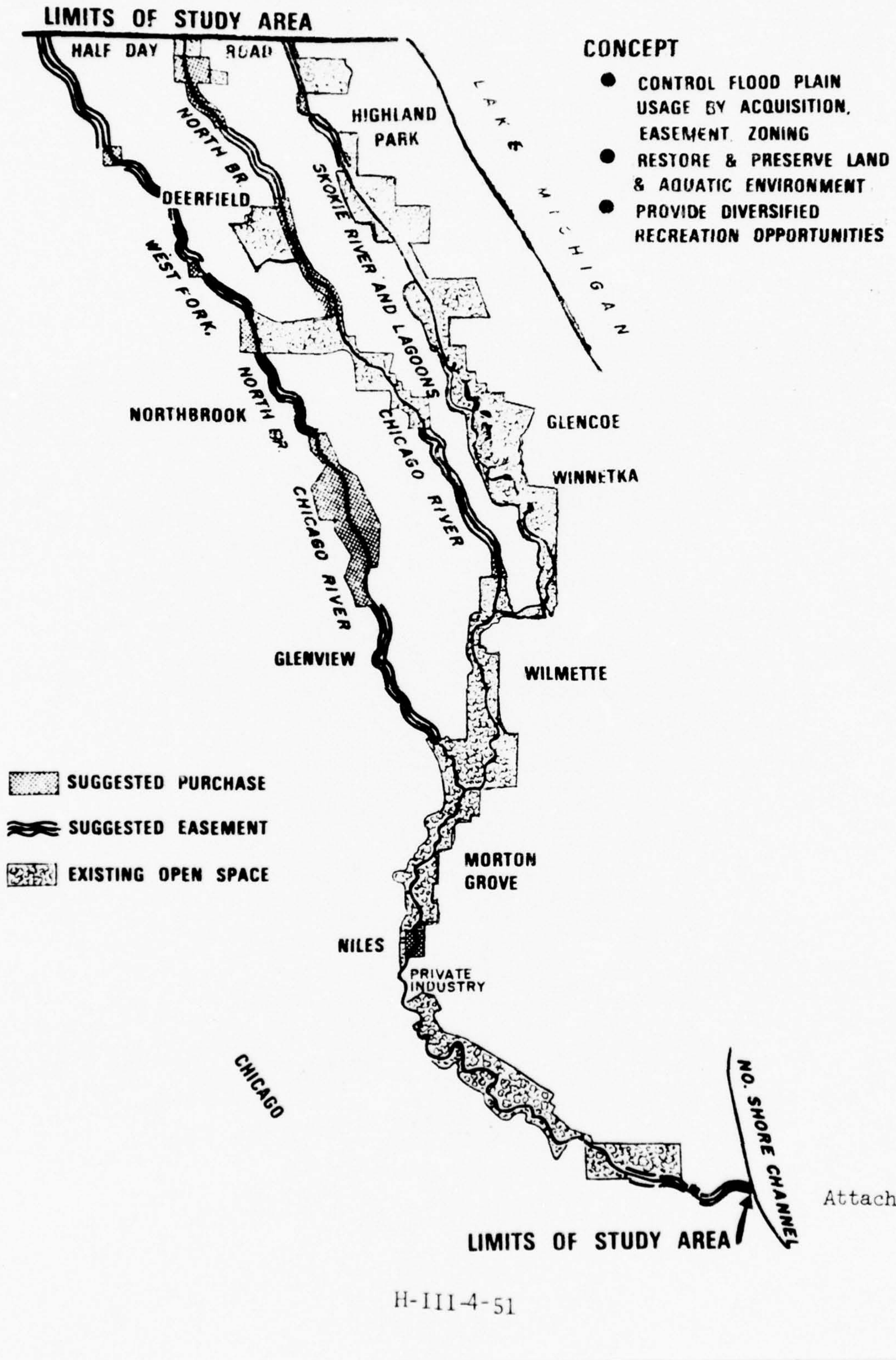
Seventy-three percent of the responses to the questionnaire indicated inadequate flow in the North Branch during the recreational season. Since each response is site specific, this percentage has a great relevance to the C-SELM plan formulation process. It is interesting to note that one hundred percent of the responses cited poor water quality as a critical problem. Eighty-five percent also expressed concern over an inadequate or non-existent fish population. Also cited frequently is a lack of access to the river, shown by the seventy-eight percent of the responses.

IMPROVEMENTS SUGGESTED

Many of the responses suggested that improvements were needed most in terms of access to the stream and public facilities. Out of a total of 87 improvements offered, 54 appeared in these two categories, with the percentage being sixty-two. This percentage is very significant, even though the total number of questionnaires returned was only approximately thirty percent of those distributed.

NORTH BRANCH, CHICAGO RIVER

PROTOTYPE STUDY



Attachment II-2

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

NCCPD-RL

29 August 1972

Mrs. Lee Botts, Director
Lake Michigan Federation
53 W. Jackson Blvd.
Chicago, Illinois 60604

Dear Mrs. Botts:

There are inclosed answers to the twenty-one (21) questions raised by members of your committee for the Chicago-South End of Lake Michigan Area Wastewater Management Study.

Because the questions are comprehensive in nature and germane to our study review, I am taking the liberty of distributing copies to all committees and their memberships.

Sincerely yours,

RICHARD M. WELLS
Colonel, Corps of Engineers
District Engineer

1 Incl.
As stated

QUESTIONS RAISED IN CITIZENS ADVISORY COMMITTEE EVALUATIONS OF
OF C-SELM PROGRESS REPORT NO. 2 - AND ANSWERS PROVIDED BY CORPS OF ENGINEERS

1. How was it determined that the regional wastewater management study should be undertaken by the Army Corps of Engineers?

The Survey Scope WWM Study was undertaken by the Corps as the result of Congressional resolutions from both the House and Senate Public Works Committees dated 10 and 23 November 1971, respectively. Included in the language of the Senate resolution is the mission to "evaluate general alternatives for the management of wastewater on a regional basis, including the elimination of pollutant discharges."

2. How was the time schedule established? (Particular concern has been expressed by almost every member of the committee about the short time allowed for evaluation by the public, leading to belief that the advisory committee function is pro forma only.)

The time-frame was established at Departmental level (Washington). The original time-frame was even much shorter than the current one, which called for essentially completing the study by this past 1 July 1972. At the request of the five District offices involved in WWM studies the time-frame was extended to March 1973. The scheduling of the study activities was done by the Chicago District, within the allotted time-frame. The District has been, and is, making serious efforts to allow the longest possible review and input time for the committees at each study stage. It is hoped that although the study has to be completed under very rigorous time constraints, it will produce the best possible answers. It is also hoped that the Advisory Committees working under the same kind of rigorous time constraints will be able to make positive and constructive contributions.

3. What is the technical basis for the feasibility of replenishing aquifers? (They seem not to take into account the continuing dimination of surface recharge areas in urban areas, for example, and in general to have an overly simplistic view of what is possible.)

The basis for replenishing of groundwater aquifers is predicted on one of two ways, depending on the alternative under consideration. Recharge can be accomplished by (1) direct application of stormwater (rural or suburban) to the land and subsequent percolation from surface to subsurface aquifers or (2) collection and land treatment of the rural stormwater and injection (well point) into the aquifer. The option of also injecting Lake Michigan or augmented (treated) stream flow directly into the aquifer for storage and ultimate withdrawal is just as viable as direct pipeline transfer to the water system of those municipalities projected as having supply deficiencies.

4. Is it established that all agricultural run-off must be treated, as the study seems to assume?

A prescribed amount of rural stormwater, 2 1/2", is given treatment primarily to eliminate agricultural nutrient pollution of the head waters of the C-SELM area rivers and streams in order to preserve the quality of the downstream suburban and urban waters. Thus all area waters are treated in proportion to need in order to preserve the attributes of NDCP quality water.

5. Could air pollution problems be caused by the processes described for removal of "critical pollutants"? What consideration has been given to recovering and re-using the carbon, nitrogen and phosphate removed?

Yes, air pollution problems can be caused primarily in the disposal of concentrated sludge with incineration methods. Therefore, a variety of sludge disposal methods are considered that minimize incineration practice and maximize the return of the sludge resource to the land utilizing the fertilizer values and humus building properties. Physical-chemical technology, however, does involve incineration of the organic sludge as part of the treatment process, with a resultant increase in air pollution potential as contrasted with the advanced biological and land systems. The potential for aerosol related pollution has been raised relative to the land system. The initial chlorination and subsequent de-clorination, prior to spraying however, should alleviate this as a possible problem. Furthermore, the sensory problem of odor commonly associated with the storage lagoons for both the advanced biological and land systems should be minimal if properly operated. Recovery of all usable concentrated constituents is an integral part of the study. The question will be addressed in the final stage of study.

6. Questions about sludge storage and distribution: How will sludge be stored in winter or when crops are growing? How will the massive quantities of stored material be moved into the appropriate location? When?

The technical consultant is investigating various sludge management opportunities which are applicable to the treatment technologies under study. The land system sludge, which accumulates on the bottom of the storage lagoon, will be hydraulically dredged from the lagoons during the period April through September and piped to adjacent land areas for land restoration and agricultural utilization through pipeline and flow distribution. The sludge from the advanced biological treatment plants will be winter stored in treatment site storage lagoons and transported during the spring, summer, and fall by the most economical transportation system (pipeline or rail, and/or barge, depending on dewatering characteristics of sludge) to holding lagoons at agricultural utilization or rehabilitation areas. During this same time period the sludge is piped from the holding lagoon and applied to the land via a flow distribution system. The physical-chemical sludge is transported in an optimum manner on a continual, year around basis from the treatment plants to storage lagoons at the land application areas.

7. What is the basis for the figures in Exhibit 2 on system performance data? No sources are cited.

Performance data in Exhibit 2 for advanced biological treatment are based primarily on small scale systems, and for physical-chemical and land

treatment on limited small scale operating experience and on pilot plant, engineering, and laboratory studies. Higher performance may be technically attainable by each process. The technical literature sources for the performance data are provided in the bibliographic reference list provided in Task 21 of the Phase I C-SELM study.

8. What is the difference between Alternatives 7, 8, 9 and 10 in regard to injection into the lake? What would be the BOD and COD of this water? Would the addition of this water relieve or exacerbate the problem in the lake in the area of injection?

In alternatives 8 & 10 the potable water transmission system is the stream (reuse option 2), and in 7 & 9, a pipeline network (reuse option 1). The alternatives do not differ with respect to injection into the lake. The BOD & COD of this water would correspond to the performance data shown in Exhibit 2 which is comparable to the natural background water quality of unpolluted C-SELM waters.

9. Would Chicago receive credit for the volume injected in terms of its withdrawal allowance?

Illinois could receive credit in terms of its withdrawal allowance, but this would be dependent on the water use and distribution proposals ultimately adopted.

10. How, and by whom, will the total wastewater management system be managed? Financed? What will happen to already established systems and how will the present capital investments in sewage treatment facilities be retired?

The answer to the first parts of this question will be developed as part of the institutional study now in progress. The economic advantage of retaining all or portions of the established system is under consideration as part of our studies evaluating the economies of scale (regionalization). The cost of retiring incurred obligations will be identified and included in the design and evaluation of those alternatives retained for final study.

11. How will distribution of drinking water be controlled in areas of critical shortage (as in some locations outside Cook County)?

The study provides for a combination of possible solutions to the projected water supply deficient areas. Alternative solutions involve withdrawal and pipeline distribution of Lake Michigan water, utilization (recharge) of the treated rural stormwater runoff, or stream withdrawals of augmented, treated flows. In all cases local distribution would be achieved through individually owned and operated (municipal or private) water systems.

12. Is separation of industrial from residential systems being considered? Or, what consideration is being given to requiring industries to remove "exotic" chemicals before discharge into the sewage system, to simplify design of the central system and increase potential for re-use of treated effluent?

Yes, both recycling and pre-treatment (by industry) for removing "exotic" or incompatible constituents, are an integral part of the system's technical design. The extent of recycling and on-site pre-treatment will be answered and will be based on an on-going cooperative study with the main industrial water users in the area. This cost will be identified and included in the final phase of study.

13. What are the energy requirements for pumping water from the south end of the management area to the north end, in the re-use alternatives using the land dispersion plan?

The single land site alternative will require 5,512 megawatt hours/day of electricity if stormwater is included, and 3,847 mwh/day if stormwater is not included. Both the multiple land site and "finger" land site alternatives will require 2,291 mwh/day if stormwater is included, and 1,811 mwh/day if it is not. It should be noted that the volume of water being pumped in these alternatives vary. Reflecting optional variances in water balance schemes, these differentials are being studied as part of our institutional and need assessments.

14. What consideration has been given to using wastes for fuel to produce electricity? Has any comparison been made between "recycling" methods?

Using wastes for fuel to produce energy (gas, electricity, etc.) has been considered during the early stages of sludge management studies. Any use of sludge for fuel involves some form of incineration with a resultant loss of its organic components as well as creation of air pollution hazards. This is true even in efficiency of the heating-burning process increased to the highest level possible. For these reasons utilization of sludge for fuel has been dropped in favor of other forms of utilization, such as agricultural fertilizer or in the rehabilitation of low-quality lands. However, incidental energy by-products of treatment processes (e.g. gas from the sludge digestion process could be utilized.

15. In pumping to recharge streams at their headwaters, would all streams be maintained or would some streams be left dry? (While it seems unlikely that every brook and creek could be "piped", such streams are important to the character of the landscape.)

All streams known to sustain year-around flows or those additionally identified by local interests as having some intrinsic value, will be supplied with pump-back flow insofar as study policy is concerned. From the standpoint of the practical detail possible in a survey scope type study, pump-back water is presently being distributed to some 30 to 40 such stream areas in the study.

16. What is the data base for evaluating ecological effects of spray irrigation with sewage effluents? How is the application rate to be determined in relation to soil type? If spraying is done at night, can the land be used during the day? (Muskegon County is not a working system; the Pennsylvannia site is not usable by people; the Melbourne, Australia, area has much less rainfall than the C-SELM area; how can comparisons be made?)

The data base for the land system is comprehensively documented in the U. of Washington and the CRREL reports. Cropping practice and cation exchange capacity of the soil are both critical to the nitrogen uptake performance of the land system, which controls the application rate. Other critical soil characteristics important to the design and functioning of the land system are the soil properties of permeability, organic content, and the available aluminum, iron, calcium, and magnesium. The properly designed land system can be used during the day if it is sprayed only during the night. Utilization of data from the operation of the Melbourne and Penn State facilities, and information concerning the Muskegon project as well as other appropriate sources, can be used to illustrate C-SELM applicability. However, comparisions of the components and features must be technically justifiable and dependable.

17. What is the ecological effect of dropping the Kankakee River water table?

The groundwater table in the Kankakee River area will not be significantly affected. It is expected that any effect created in the interest of better treatment will be monitored and appropriately balanced with regulated application of water on the surface and controlled withdrawal from the subdrainage system.

18. If the power plants are not included in the total system, what is the acturial effect? Are the power plants necessary in terms of cost justification?

The power plants should not be considered an integral part of the land system nor are they necessary to achieve the comparative cost-effective advantage. They were included to demonstrate an additional utility (synergism) of wastewater and hence a potential source of revenue from an investment that has to be made if the projected regional power needs are to be met. Just as significant is the opportunity to redirect the siting of power plants inland, away from Lake Michigan or the Illinois River, where the necessary large volume of dependable cooling water are to be found.

19. How long can land be used for spray disposal? What use can be made of it afterwards? What will be the effect of accumulation of heavy metals? What other substances may accumulate in "unnatural" quantities in the soil as it serves its filter function?

The land system is designed for a 50-year life; however, there is every indication that it could be used for this purpose for a 100 years or more. The land could be used for any purpose afterwards, including agriculture. The accumulation of heavy metals will be controlled by monitoring and control of application rates for the purpose of eliminating heavy metal effects. This will be accomplished by appropriate control as required, at their sources. Other comparable substances in the waste stream can be controlled in a similar way.

20. What is the usable time period for holding ponds?

The usable time period for holding ponds is expected to equal or exceed that of the land used for spray irrigation; performance of regular maintenance will insure that holding ponds will be usable for the life of the proposed system.

21. Who will purchase, own and manage the land disposal areas?

There are several ownership and management alternatives open and all are being investigated in detail within the framework of inter-agency coordination and the institutional study presently in progress. Ownership alternatives incude: (1) obtaining the land in fee; as fee owner the public entity would have the desired minimum rights, (2) obtaining an interest in the land other than fee; this interest would be either an easement or a leasehold estate (there are many kinds of options open under this arrangement), and (3) obtaining the required minimum rights by contract, no interest in the land would be acquired; the contract would be between the public entity and the landowner. Managment alternatives include: (1) by the public itself, (2) by a private party, (3) by the public through an existing or specially formed corporation or assorted governmental authorities. The above lists are not all inclusive, they are merely illustrations of the available and considered options. These options will be further explored with the proposed Agricultural and Rural Citizen Advisory Committee currently being formed.

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

STAGE IV: TENTATIVELY SELECTED ALTERNATIVES

The material presented herein is a summary of the interaction with the public during the fourth stage of study. As such, the material is presented in two main parts as follows:

Part 1 - Advisory Committee Meetings - Tentatively Selected Alternatives

Part 2 - Plan Formulation Public Meeting Summaries

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

STAGE IV - PART I

CITIZENS ADVISORY COMMITTEE

(Summary - Fourth Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

STAGE IV - PART I

TENTATIVELY SELECTED ALTERNATIVES

TABLE OF CONTENTS

SECTION I - CORPS OF ENGINEERS' PRESENTATION

INTRODUCTION

Col. Richard M. Wells began the meeting by giving a review of the eleven intermediate alternatives that were presented at the prior meeting, and an outline of the basic policy issues requiring resolution pursuant design of the final alternatives. The screening procedure for reducing the intermediate alternatives was then introduced. Included was a step by step discussion of the phases in the screening process leading to the identification of tentative conclusions. Col. Wells presented these alternatives as a tentative selection of final alternatives, stressing the fact that firm conclusions would be made only after input is received from each of the advisory committees and from the general public through public meetings.

The tentative selections were made basically to facilitate discussion, thereby enhancing communication of the alternatives thought to be more desirable by committee members. The presentation was conducted with an intermittent verbal interchange with committee members to obtain their views; but for clarity of presentation of this summary, the discussion that occurred during the briefing is deferred to Section II for summarization.

BASIC POLICY ISSUES

Prior to describing the screening process, Col. Wells identified the basic policy issues which must be resolved in the coming few weeks with the appropriate Federal, State, and local agencies. Decisions on the issues are needed as input to design of the final systems. Initially, decisions are needed relative to the water balance that will be used in the design of the final "No Discharge of Critical Pollutants" systems.

For example, what use can be made of Lake Michigan as a reservoir for treated water withdrawn at points different from the input locations? What is the best flow level to maintain in the area's streams? What limits, if any, are placed on diversion of water for recreational and environmental purposes to streams, such as the Fox River, outside of the study area?

The next decision is to determine what recreational programs such as parks, wildlife areas and urban fishing areas are appropriate for integration into our final alternative systems. We must then determine the positions of the Federal Power Commission, appropriate State agencies, and the local utility companies concerning combinations of power and wastewater treatment facilities.

SCREENING PROCESS

The goal of the screening process is to reduce the eleven intermediate alternatives to five final alternatives for detailed design and evaluation in the final phase of the study. This screening process will eliminate the less promising alternatives: retain the best existing standards alternative; and retain a full range of the three advanced treatment technology options, ie., advanced biological plants, physical chemical plants and land treatment.

Several major factors could be considered to be significant parameters in screening. The factors evaluated by the socio-environmental evaluation team includes the following system elements. The collection, transportation and storage of input wastewater; treatment facilities and processes, liquid effluent quality and water reuse; sludge management; and synergisms.

Socio-environmental impacts attributable to the first two system elements vary between alternatives. Therefore, these are important elements to consider. Liquid effluent quality and water reuse can be designed as a constant for the "No Discharge of Critical Pollutants" alternatives. Hence, this factor does not influence screening. The evaluation team strongly endorsed stream movement of reuse water whenever possible rather than pipeline movement.

The evaluation team identified land reclamation as a better environmental option for aludge management than agricultural use. Land reclamation costs are somewhat higher because of longer transportation distances. After a policy decision has been made concerning the option to be used, sludge management can be designed as a constant and therefore will also not be a factor for use in screening.

Many synergisms are being considered for the alternative systems. Since decisions have not been reached concerning these synergisms, this also is not an appropriate screening factor. Total annual costs of course vary between systems and hence can be used in screening. Institutional impacts are significant for all "No Discharge of Critical Pollutants" alternatives. However, the differential impacts between these systems are less significant. Therefore, institutional impacts are not recommended as a factor for this screening. For these reasons the major factors identified as important for this stage of screening are the socio-environmental impacts from the first two system elements and the alternative costs.

The steps in the planned screening process are diagrammed on Attachment I-1. The initial steps to be done concurrently are:

(1) Compare the two existing standard alternatives and reduce them to one alternative for final design.

(2) Compare the four advanced biological plant alternatives, the four physical-chemical plant alternatives, and the two land treatment alternatives. Reduce these four to one alternative from each category for further consideration.

(3) Retain the combined advanced biological/physical-chemical plant alternative, the combined advanced biological/land treatment alternative, and the combined land and open space alternative. Out of this comparison will come four "No Discharge of Critical Pollutants" alternatives for final design and evaluation. Each of these steps are discussed in more detail below.

Existing standards alternatives A and B have 64 and 41 plants respectively. The comparative socio-environmental ratings developed by the evaluation teams for the two critical system elements have been normalized to a maximum rating of 1 (see Attachment I-2). The 64 plant system received the best socio-environmental score for the collection, transport and storage element while the 41 plant system received the best score for treatment facilities and processes. The total score is slightly higher with the 41 plant system.

The collection, transport, and storage facilities for the 41 plant system received a lower score since with a lesser number of plants the electric power needed for pumping is increased, and because the increased need for more treated water at redistribution points causes disruptions in neighborhood environments, recreational activities, and the ecosystem status. However, the treatment facilities and process score higher with the 41 plants since less localities have a treatment plant and the resultant plant impacts on aesthetics, ecosystem status, recreational activities, neighborhood environments and health and safety are less.

Annual costs for the 64 plant system are three million dollars per year lower, which indicates that the existing regional plans include a cost optimum system. Considering the minor variation in socio-environmental scores between systems. Col. Wells stated the tentative conclusion to carry forward the 64 plant existing standards system, and requested the views of the committee (see SECTION II).

For the four advanced biological plant alternatives, as with the existing standards plants, an increase in regionalization from 64 to 8 plants produces a progressive decrease in the socio-environmental scores for the collection, trnasport and storage systems (see Attachement I-3). Conversely, a progressive increase in the scores for treatment facilities and processes occurs up to a maximum score with the 17 plant system. The highest composite score is achieved by the 17 plant system.

The reasons for the scores for the collection, transport and storage systems are similar to those discussed previously; regionalization entails increased power demands and increased disruptions caused by the transport of reuse water.

Gains stemming from the reduction in the number of locales having a plant in their midst were developed considering plant locations. These gains are greatest with 17 plants since with a further reduction to 8 plants, these plants are located in areas where the positive gains lessen.

Considering annual system costs, the 17 plant system ranks first with the lowest cost. Col. Wells stated the tentative conclusion to retain the 17 advanced biological plant alternative which ranks first in the socio-environmental ratings and in cost, and requested the views of the committee (see SECTION II).

Attachment II-4 compares the four physical-chemical plant alternatives. The relative ratings for the collection, transport and storage systems are identical to those shown previously for the four advanced biological plants. However, in this case the increase in the treatment facilities and processes scores with increasing regionalization continues to the 8 plant level. The 41 plant system receives the highest composite score.

In the evaluation of treatment facilities and processes, air quality is critical. Each decrease in the number of plants reduces the number of areas suffering from the air pollutants produced by these plants. Therefore, the 8 plant system received the highest score. Otherwise the reasons for the scores for both system elements are similar to the reasons discussed in previous plant comparisons. One added element is the negative impact on flora and fauna with the physical-chemical treatment facilities and processes.

From a cost standpoint, the 17 plant system ranks first. The 41 plant system ranks third with an increased cost differential of 6 million dollars per year compared to the 17 plant system. Considering the relatively minor variation in costs between the 17 and 41 plant systems, the tentative conclusion is that the 41 physical-chemical plant system should be retained. The views of the committee were then requested (see SECTION II).

Attachment I-5 compares the land treatment alternatives employing a single site and six dispersed sites. With both system elements, the six site alternative scores highest. Considering the collection, transport and storage system elements, the single site scores lower than 6 sites since the single site requires greater movement of treated water producing disruptions in neighborhood environments, recreational activities, aesthetics and flora and fauna.

Treatment facilities and processes for the single site produce a greater potential socio-environmental impact on social stability in the areas of the site; they act as a barrier to development; and they impact negatively on cultural, educations, recreational and eco-unique areas and on flora and fauna.

Annual costs for the single site alternative are 11 million dollars less than for the six site alternative. Considering the socio-environmental superiority of the 6 site system and the relatively minor difference in system costs, the tentative conclusion is that the 6 site alternative should be retained. The views of the committee were requested (See SECTION II).

Attachmentt I-6 shows a comparison of Alternative I with six land sites and Alternative K with six land sites and utilization of open space for storm-water treatment.

The socio-environmental rating for Alternative K is considerably higher than for Alternative I, reflecting the major environmental benefits that can be achieved with additional open space. However, the difference in total annual costs for the two systems is 153 million dollars. Equivalent open space benefits can be achieved for less cost if a similar amount of the open space is purchased and not used for stormwater treatment. In other words, this has proven to be an inefficient combination in which the additional wastewater transportation and irrigation system costs outweigh the benefits achieved by not treating the wastewater at a regional site. Hence, the tentative conclusion is that Alternative K should be dropped. The views of the committee were then requested (see SECTION II).

The final comparison is for the treatment plant Alternatives: D with 41 physical-chemical plants, E with 17 advanced biological plants, G with a combination of five advanced biological and 12 physical-chemical plants, and J with a combination of 5 advanced biological plants and 6 land sites. (See Attachement I-7).

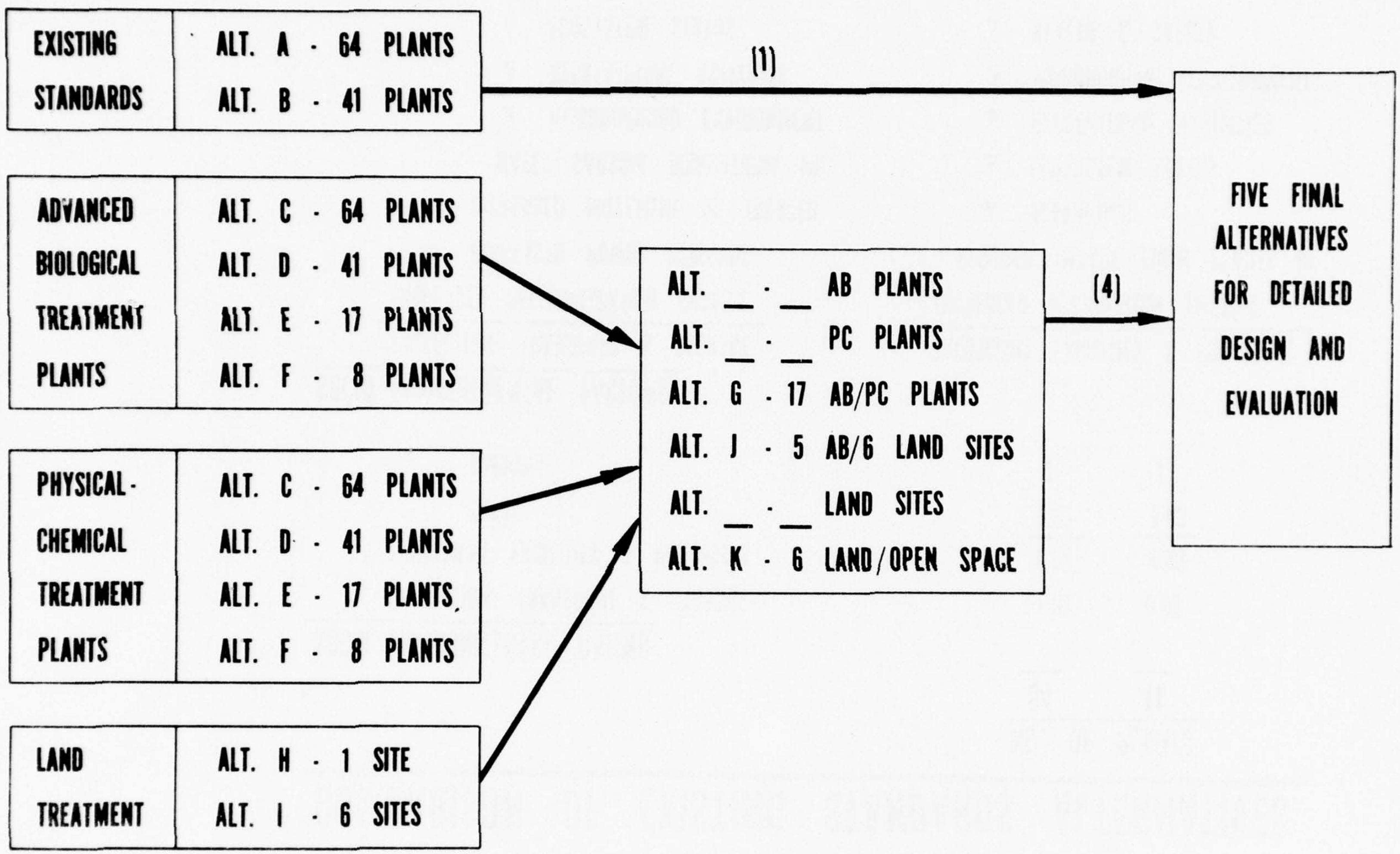
The alternatives containing physical-chemical plants rate third and fourth from a socio-environmental standpoint because of the air pollution and waste of nutrients through partial incineration which are associated with these plants. From an annual cost standpoint, the 41 physical-chemical plant alternative ranks second while the physical-chemical/advanced biological plant combination ranks third. The tentative conclusion is to retain Alternative D with 41 physical-chemical plants, Alternative E with 17 advanced biological plants, and Alternative J with the advanced biological/land treatment combination. This combination of alternatives provides a clear comparison of the advanced biological and physical-chemical system design in the study which may b valuable if later developments solve the air pollution problem associated with these plants; a collection, transport and storage system design for 41 and 17 plant systems; and a plant/land combination system for design and analysis. Col. Wells again requested the views of the committee tentatively selected alternatives (see SECTION II).

TENTATIVELY SELECTED ALTERNATIVES

In summary, the tentative conclusion is to retain five alternatives. These are: (1) Alternative A, achieving existing standards with 64 plants following existing plans, plus four "No Discharge of Critical Pollutants" alternatives; (2) Alternative D with 41 physical-chemical plants; (3) Alternative E with 17 advanced biological plants; (4) Alternative I with 6 land sites; and (5) Alternative J with a combination of 5 advanced biological plants and 6 land sites.

Col. Wells then requested questions concerning the tentative selections or other aspects of the study, as summarized in the following section.

SCREENING STEPS



COMPARISON OF EXISTING STANDARDS ALTERNATIVES

	NO. OF PLANTS 64	NO. OF PLANTS 41
SOCIO-ENVIRONMENTAL RATING		
COLLECTION, TRANSPORT & STORAGE	1.00	0.03
TREATMENT FACILITIES & PROCESSES	0.02	1.00
TOTAL	1.02	1.03
RANKING	2	1

SOCIO-ENVIRONMENTAL FACTORS

COLLECTION, TRANSPORT & STORAGE

INCREASED REGIONALIZATION ENTAILS:

- INCREASED POWER DEMANDS
- INCREASED MOVEMENT OF TREATED WATER CAUSING DISRUPTIONS IN:
  - Δ NEIGHBORHOOD ENVIRONMENT
  - Δ RECREATIONAL ACTIVITIES
  - Δ ECOSYSTEM STATUS

TREATMENT FACILITIES & PROCESSES

INCREASED REGIONALISM ENTAILS

REDUCED IMPACT FROM PLANTS IN:

- Δ AESTHETICS
- Δ ECOSYSTEM STATUS
- Δ RECREATIONAL ACTIVITIES
- Δ NEIGHBORHOOD ENVIRONMENT
- Δ HEALTH & SAFETY

	64	41
ANNUAL COSTS ($ MILLIONS)	299	301
RANKING	1	2

TENTATIVE PREFERENCE: 64 PLANT SYSTEM

Attachment 1-2

COMPARISON OF ADVANCED BIOLOGICAL PLANT ALTERNATIVES

	NUMBER OF PLANTS			
	64	41	17	8
SOCIO-ENVIRONMENTAL RATING				
• COLLECTION, TRANSPORT & STORAGE	1.00	0.94	0.83	0.63
• TREATMENT FACILITIES & PROCESSES	0.02	0.78	1.00	0.73
TOTAL	1.02	1.72	1.83	1.36
RATING	4	2	1	3

SOCIO-ENVIRONMENTAL FACTORS

COLLECTION, TRANSPORT & STORAGE

INCREASED REGIONALIZATION ENTAILS:

- INCREASED POWER DEMANDS
- INCREASED MOVEMENT OF REUSE WATER CAUSING DISRUPTIONS IN:
  - △ NEIGHORHOOD ENVIRONMENT
  - △ RECREATIONAL ACTIVITIES
  - △ FLORA & FAUNA SUPPLY
  - △ AESTHETICS
  - △ ECOSYSTEM STATUS

TREATMENT FACILITIES & PROCESSES:

INCREASED REGIONALIZATION (TO 17 PLANTS) ENTAILS REDUCED IMPACT FROM PLANTS IN:

- △ NEIGHBORHOOD ENVIRONMENT
- △ RECREATIONAL ACTIVITIES
- △ AESTHETICS
- △ ECOSYSTEM STATUS
- △ HEALTH & SAFETY

NOTE: 8 PLANTS ARE LOCATED IN AREAS WHERE GAINS LESSEN

	64	41	17	8
ANNUAL COSTS ($ MILLION)	934	925	919	920
RANKING	4	3	1	2

TENTATIVE PREFERENCE: 17 PLANTS (ALT. E)

COMPARISON OF PHYSICAL-CHEMICAL PLANT ALTERNATIVES

	NUMBER OF PLANTS			
	64	41	17	8
SOCIO-ENVIRONMENTAL RATING				
COLLECTION, TRANSPORT & STORAGE	1.00	0.94	0.83	0.63
TREATMENT FACILITIES & PROCESSES	0.82	0.98	0.97	1.00
TOTAL	1.82	1.92	1.80	1.63
RANKING	2	1	3	4

SOCIO-ENVIRONMENTAL FACTORS

COLLECTION, TRANSPORT & STORAGE

INCREASED REGIONALIZATION ENTAILS:

- INCREASED POWER DEMANDS
- INCREASED MOVEMENT OF REUSE WATER CAUSING DISRUPTIONS IN:
  - Δ NEIGHBORHOOD ENVIRONMENT
  - Δ RECREATIONAL ACTIVITIES
  - Δ FLORA & FAUNA SUPPLY
  - Δ AESTHETICS
  - Δ ECOSYSTEM STATUS

TREATMENT FACILITIES & PROCESSES

INCREASED REGIONALIZALISM ENTAILS

REDUCED IMPACT FROM PLANTS IN:

- Δ NEIGHBORHOOD ENVIRONMENT
- Δ RECREATIONAL ACTIVITIES
- Δ AESTHETICS
- Δ ECOSYSTEM STATUS
- Δ HEALTH & SAFETY
- Δ FLORA & FAUNA SUPPLY

NOTE: AIR QUALITY IS CRITICAL

	64	41	17	8
ANNUAL COSTS ($ MILLION)	883	878	867	869
RANKING	4	3	1	2

TENTATIVE PREFERENCE: 41 PLANTS (ALT. D) (MODIFIED ?)

COMPARISON OF LAND TREATMENT ALTERNATIVES

	NUMBER OF SITES	
	1	6
SOCIO-ENVIRONMENTAL RATING		
COLLECTION, TRANSPORT & STORAGE	0.86	1.00
TREATMENT FACILITIES & PROCESSES	0.02	1.00
TOTAL	0.88	2.00
RATING	2	1

SOCIO-ENVIRONMENTAL FACTORS

COLLECTION, TRANSPORT & STORAGE

SINGLE SITE REQUIRES GREATER MOVEMENT OF TREATED WATER PRODUCING DISRUPTIONS IN:

- △ NEIGHBORHOOD ENVIRONMENT
- △ RECREATIONAL ACTIVITIES
- △ AESTHETICS
- △ FLORA & FAUNA

TREATMENT FACILITIES & PROCESSES

SINGLE SITE PRODUCES GREATER POTENTIAL IMPACT:

- △ ON SOCIAL STABILITY
- △ AS BARRIER TO DEVELOPMENT
- △ ON CULTURAL, EDUCATIONAL, RECREATIONAL & ECO-UNIQUE AREAS
- △ ON FLORA & FAUNA

	1	6
ANNUAL COSTS ($ MILLION)	511	522
RANKING	1	2

TENTATIVE PREFERENCE: 6 SITES

COMPARISON OF ALTERNATIVES I AND K

SOCIO - ENVIRONMENTAL RATING

ALTERNATIVE I - 0.97	]	OPEN SPACE PROVIDES
ALTERNATIVE K - 2.00	]	MAJOR ENVIRONMENTAL BENEFITS

ANNUAL COSTS ($ MILLION)

ALTERNATIVE I - 522	]	EQUIVALENT OPEN SPACE BENEFITS
ALTERNATIVE K - 675	]	CAN BE ACHIEVED FOR LESS COST
DIFFERENCE - 153	]	WITHOUT TREATMENT SYSTEM COMBINATION

TENTATIVE CONCLUSION: DROP ALTERNATIVE K

Attachment I-6

COMPARISON OF TREATMENT PLANT ALTERNATIVES

	ALT. D 41 P-C	ALT. E 17 AB	ALT. G 5AB/12P-C	ALT. J 5AB/6 LAND
SOCIO-ENVIRONMENTAL RATING				
COLLECTION, TRANSPORT & STORAGE	1.00	0.89	0.89	0.78
TREATMENT FACILITIES & PROCESSES	0.01	1.00	0.41	0.84
TOTAL	1.01	1.89	1.30	1.52
RANKING	4	1	3	2

SOCIO-ENVIRONMENTAL FACTORS

PHYSICAL-CHEMICAL RATES LOW BECAUSE OF AIR POLLUTION AND WASTE OF NUTRIENTS THROUGH PARTIAL INCINERATION PROCESS

	ALT. D	ALT. E	ALT. G	ALT. J
ANNUAL COSTS ($ MILLION)	878	919	891	806
RANKING	2	4	3	1

TENTATIVE CONCLUSION: RETAIN ALTERNATIVES D, E & J TO GIVE:

- CLEAR COMPARISON OF ADVANCED BIOLOGICAL & PHYSICAL-CHEMICAL SYSTEMS
- PROVISION OF PHYSICAL-CHEMICAL SYSTEM IF LATER DEVELOPMENT SOLVES POLLUTION PROBLEM
- COLLECTION, TRANSPORT & STORAGE DESIGN FOR 41 & 17 PLANTS
- EVALUATION OF PLANT/LAND COMBINATION

WASTEWATER MANAGEMENT STUDY
CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION II

STEERING COMMITTEE
(Summary - Fourth Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

19 September 1972

Preface

On 19 September 1972, the Steering Committee for the Chicago-South End Lake Michigan Wastewater Management Study met for the fourth in a series of advisory meetings. The committee is composed basically of governmental agencies which have responsibility for wastewater management, and who have an interest is providing viable plans to alleviate the wastewater problem.

The meeting was held at the Everett M. Dirksen Building, 219 South Dearborn Street, Chicago. The thrust of the meeting was to advise the Corps at a critical decision making point in the study, the selection of final alternatives from the alternatives presented at the third meeting.

A list of participants and a summary of comments by committee members during and subsequent to the presentation are presented herein.

Steering Committee
19 September 1972 Attendance

Organization and Representative(s)

Mr. James O. Russel
Ind. Dept. Natural Resources

Mr. Harlan D. Hirt
Mr. Dora W. Hoole
U.S.E.P.A.

Col. Joseph Smedile (Ret.)
Northeastern Illinois Planning Commission

Mr. Kenneth Cypra
Lake Porter County Regional Planning
and Transportation Commission

Mr. Thomas R. Wiles
Ill. Dept. Business & Economic Development

Mr. Clint J. Keifer
Dept. Public Works, Chicago

Mr. Bernard Prola
Mr. Salvador D. Nabong
Dept. Public Works, Joliet

Mr. Forest Neil
Mr. Frank Kudrna
Metropolitan Sanitary District of
Greater Chicago

Mr. Mervin Grant
DuPage Co. Dept. Public Works

Mrs. Samuel Rome
League of Women Voters, Illinois

Mrs. D. Trump
League of Women Voters, Indiana

Col. John B. Corey (Ret.)
Dept. Water and Sewers, Chicago

Mr. Jack W. Cormack
Greeley & Hansen for NSSD

Organization and Representative(s) (Cont'd)

Corps of Engineers Personnel

Col. Richard M. Wells
Major Leroy R. Hayden
Mr. James M. Maas
Mr. Carl Hessel
Mr. William Sanders

Consultants to Corps

Mr. Wayne Cowlishaw
Bauer Engineering, Inc.

Observers

Mr. Ronnie Murphy
Soil Conservation Service

COMMITTEE COMMENTS AND DISCUSSION

Basic Policy Issues

CM: What does Commonwealth Edison say about the availability of water to cool so many power generating plants?

A: There is more water available in lagoons than is required for the projected 2020 water cooling needs due to electric power generation.

CM: Is the $200 million identified as savings in power generation cost?

A: Yes, the figure represents a savings to the system.

CM: There is concern for the impact of a concentration of power sites in one area.

A: National defense and other reasons indicate that dispersed sites are better.

CM: Where can power plants be sited other than at lagoons?

A: Some other alternatives are Lake Michigan, streams, and cooling towers. All should be considered and compared.

CM: The use of Lake Michigan as a reservoir for discharge of water containing 400 mg/l dissolved solids would violate existing standards. The lower basin of the lake acts as a cell, but there is some mixing; this legal and moral issue needs to be resolved.

A: Yes, it does. This will be given further consideration.

Comparison of Existing Alternatives

CM: How were the aesthetics of the different systems evaluated?

A: The visual and sensual aspects of adapting different numbers and locations of plants into the total environment was the basic consideration.

CM: It is hard to believe that the study could not find a savings, ie., a less expensive, different number of plants system than the present system.

A: The study does not permit the level of detail necessary to precisely define the exact cost optimum number of treatment facilities. A savings may be identified but only after long, precise study.

CM - Committee Member, A-Answer

Comparison of Advanced Biological Treatment Plants

CM: Which of the Metropolitan Sanitary District's treatment plants are included in the 17?

A: The West-Southwest, North Side, Calumet, and the proposed O'Hare and Salt Creek plants are included.

Comparison of Physical-Chemical Plant Alternatives

CM: The sludge is useful as a soil conditioner.

A: Yes, but the P-C sludge is not as useful as advanced biological. P-C sludge is good for reducing soil acidity.

Comparison of Land Treatment Alternatives

CM: Will water from the six sites be returned to Lake Michigan?

A: Yes, the water will be returned if there is no adverse impact. Pipe costs can be decreased by use of the Lake.

CM: At the Indiana Public meeting, opposition to the single site plan was very strong, indicating that this alternative should be eliminated.

A: The six site system does seem to be preferable.

CM: The Linton, Mields and Costen, Inc. report entitled "Evaluation of Institutional, Financial and Manpower Factors" neglected to mention that Appendix A to the Metropolitan Sanitary District's Sewage and Waste Control ordinance prohibits any discharge to Lake Michigan.

CM: The ordinance also prohibits using the lake as a reservoir.

A: The ordinance could change if the discharge water were of very high quality.

Further Discussion

CM: Is the cost of deep tunnel collection of combined sewage included?

A: Yes, it is included in all alternatives as a common base cost item.

CM: Is treatment plant design for a capacity of twice the dry weather flow?

A: Treatment plant facilities are designed and costed for two separate flow options: average dry weather flow plus stormwater runoff (referred to as with stormwater option) and average dry weather flow plus normal stormwater infiltration (referred to as without stormwater option.) Treatment plants in the with stormwater option are designed for a capacity equal to the optimum pump out rate from stormwater management systems plus the average daily wastewater flow. If the estimated peak diurnal flow to the treatment plant exceeds this amount, then storage is provided at the plants to regulate the peaks.

CM: What is the status of the recycle analysis?

A: The analysis is underway. No conclusions have been reached yet on the volume of flow and magnitude of industrial pretreatment.

CM: Will the slide presentation be reproduced and distributed to Committee members?

A: Yes, this material will be sent.

CM: Is it safe to assume that all questions are being researched?

A: Yes, the policy has been to follow up on questions. Questions of particular concern can be given for response.

CM: During discussion with the Commerce and Industry Advisory Committee, has there been any indication of pending legislation that would require renovation by industry of strip mined areas?

A: No, discussion has not evolved on such legislation.

The meeting was adjourned with no further comments.

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WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION III

CITIZENS ADVISORY COMMITTEE
Conservation and Environmental Interests
(Summary - Fourth Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

13 September 1972

Preface

On 13 September 1972, members of the Citizens Advisory Committee for Conservation and Environmental Interests met with U. S. Army Corps of Engineers, Chicago District personnel for the fourth in a series of meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The committee is one of several advisory committees participating in the public involvement and participation program for the study.

The meeting was held at the YWCA, 37 South Wabash Avenue, Chicago. The thrust of the meeting was to advise the Corps at a critical decision making point in the study, the selection of final alternatives from the alternatives presented at the third meeting.

A list of participants and a summary of comments by committee members during and subsequent to the presentation is presented herein.

Citizens Advisory Committee for
Conservation and Environmental Interests
13 September 1972 Attendance

Organization and Representative

Mrs. Lee Botts, Committee Chairman
Lake Michigan Federation

Dr. Jack Snarr, Committee Co-Chairman
Cook County Clean Streams Committee

Ms. Nancy Ann Flowers
Lake Michigan Federation

Corps of Engineers Personnel

Col. Richard M. Wells
Maj. Leroy R. Hayden
Mr. James M. Maas
Mr. Carl W. Hessel
Mr. Mylo Ryan
Mr. W. Henry Sanders, III

Consultant to Corps

Dr. Donald Matschke
Bauer Engineering, Inc.

COMMITTEE COMMENTS AND DISCUSSION

Due in part to the limited attendance and in an effort to facilitate the meeting, a review of the 11 intermediate alternatives was omitted. Committee chairman Botts felt that there were many reasons for the lack of attendance. A number of members, she stated, felt that they could provide more useful input at the public meeting scheduled a week hence, due to the lack of time for discussion at meetings. Mrs. Botts also stated that, due partially to this time constraint, the committee was not functioning. Further, she did not expect the present meeting to include another presentation and did not understand what input the Corps wanted from the committee.

Col. Wells answered that the advisory committees were formed to obtain response from particular segments of the public, in this instance to gauge the conservation and environmental concerns to ensure that the study is sensitive to these needs. It is because of the great amount of data generated for the study that the type of presentations given was developed to facilitate comprehension. Col. Wells stated that an hour of discussion usually succeeded the presentation, and that discussion sometimes occurs during the presentation.

It was agreed by those present that the committee had provided significant information and other input to the study, most notably in development of the North Branch Chicago River Prototype Study, but that perhaps committee members had reached the point in the study of diminishing returns to scale at which members could provide little additional input.

Following are reactions to the screening process and concluding remarks of the meeting.

Comparison of Existing Alts

CM: There is no noticeable difference between alternatives A and B in terms of impact on the environment, institutional impact, etc.

Comparison of Advanced Biological Alts

CM: The socio-environmental ranking of the systems is surprising. It would seem that the 8 plant alternative would be preferable, since it required only two-thirds the land area and displaced only three-fourths the people of the 17 plant system, while requiring only 4 percent more power and a similarly small increase in cost. Perhaps the key to cost is site location of the plants.

CM - Committee Member, A - Answer

Comparison of P-C Plant Alts

CM: A P-C system should be kept since it appears to have less of an impact on people displacement; however an advanced biological system appears better in other aspects.

Comparison of Land Treatment Alts

CM: There is no clear difference in water quality between the six sites and the single site system, but the six site system is preferable because the single site system is subject to total failure with no backup unit. Failure at one of the six sites could be corrected by rerouting the waste flow to one of the other sites.

A: The systems are designed to attain the same water quality.

CM: Would this rerouting require interconnection of sites?

A: Yes it would, and this has not been included in the design. The flexibility and reliability of systems will be studied when looking at the final 5 alternatives.

CM: From an institutional standpoint, the single site system does not seem to be workable.

Comparison of Alts I & K

CM: Integrating park systems, open space plans, etc., seem to be beyond the realm of a wastewater management study.

A: The study addressed this concept to ascertain what multiple use benefits might accrue by intentionally planning for open space. However, it has become apparent that incorporating such an open space plan into a wastewater treatment system is uneconomical. It is less expensive to accomplish open space and wastewater treatment planning separately.

CM: (Dr. Snarr) The open space plan, alternative K, should be dropped.

Comparison of Treatment Plant Alts

CM: It is difficult to justify keeping alternative J when it is compared to I, even though the five large treatment plants of alternative J would be eliminated by alternative I. Perhaps the plant siting in J could be more economical, or three of the large plants could be increased in capacity to eliminate the Kankakee site and the required supply and return pipes, thus effecting a cost savings.

A: The five plants were chosen for these reasons. The evaluators have suggested a possible northward shift of the land site so that shorter lengths of pipes would be required.

CM: The significant cost difference between alternatives I and J may preclude a justification for looking at modified schemes.

A: The alternatives are constructed in such a manner that modifications can be easily studied. This was done early in development of the initial 19 alternatives. Alternative J looks best from a political standpoint if residents did not want to have a complete land treatment system and yet still wanted to save money with a land treatment approach.

Further Discussion

CM: More interpretation and less technical material is needed for the committee to provide input, especially in consideration of the study schedule.

CM: An Advisory Board to the Chicago-District Office may have proven more viable than the present committee structure. A small, select group could be chosen, similar to the NIPC advisory board. The group could work with the District to identify studies that need to be performed and help establish priorities for study. It could then assist in forming citizens advisory groups for particular studies.

A: This can be done, but the problem would remain of the group keeping abreast of the many study activities.

The meeting was concluded with the distribution of study material, and the decision that no immediate need existed for another committee meeting.

WASTEWATER MANAGEMENT STUDY
CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION IV

CITIZENS ADVISORY COMMITTEE
COMMERCE AND INDUSTRY
(Summary - Fourth Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

12 September 1972

Preface

On 12 September 1972, members of the Advisory Committee for Commerce and Industry met with U. S. Army Corps of Engineers, Chicago District personnel for the fourth in a series of meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The committee is one of several advisory committees participating in the public involvement and participation program for the study.

The meeting was held at the Everett M. Dirksen Building, 219 South Dearborn Street, Chicago, Illinois. The thrust of the meeting was to advise the Corps in its selection of the five alternatives that will be retained for final study based on the eleven alternatives presented at the previous (third) meeting.

A list of participants and a summary of comments by committee members during and subsequent to the presentation is presented herein.

Advisory Committee for Commerce and Industry
12 September 1972 Attendance

Organization and Representative

Mr. John L. Engler
Atchison, Topeka & Santa Fe Railway Co.

Mr. Thomas Kinney
Interlake, Inc.

Mr. C. W. Kern
Northern Indiana Public Service Co.

Mr. Louis Bulger
Sargent & Lundy

Mr. Richard B. Schwendinger
Standard Oil Co., Ind.

Mr. Clarence W. Klassen (Chairman)
Mid-West Coal Producers

Mr. David Schulary
Abbott Labs

Mr. Gerald L. Spaeth
Calumet Area Industrial Development Commission

Mr. Robert Barnett
P&W Engineers

Mr. S. Matthew Horan
Urban Investment Development Co.

Mr. Robert F. Collen
Northern Illinois Gas Co.

Mr. Thomas L. Reid
Illinois Manufacturers Assn.

Corps of Engineers Personnel

Colonel Richard M. Wells
Mr. James M. Maas
Mr. W. Henry Sanders, III
Mr. Milo Ryan

Consultant to Corps

Dr. Donald Matschke

COMMITTEE COMMENTS

CM: In the value ratings (human factors weights), the value given to industrial production is extremely low, especially since industry accounts for about a million jobs in this area, 900 thousand of which are in the Chicago metropolitan area.

A: The ratings are that of the socio-environmental evaluation team. Each committee will be asked to complete a human factors rating form to be distributed at the end of the meeting. Identification of each committee's relative rating will enable a comparison between the various public interest groups and the evaluation team. The results will then be used and incorporated in the final evaluation and report.

CM: Has any consideration been given to the political consequences of advocating the land system?

A: The study is far from the stage of advocating any particular technology. The present concern is the development of alternatives. The institutional aspects, however are being discussed in separate reports, copies of which will be furnished in the near future.

CM: There is concern that government may adapt noise and odor regulations. Consideration should therefore be given to the noise and odor impacts of the alternatives.

A: Impacts due to odor are assessed as part of the socio-environmental impact analysis. The current indication is that there will be no odor problem nor much noise associated with the systems.

CM: (Mr. Klassen) There is much concern at Mid West Coal Producers concerning land disposal of sludge. The concern is not with the concept but rather with the merits of land disposal, especially in strip-mined areas. Within this framework the Coal Producers prepared the following statement to be presented at this meeting.:

CM-Committee Member, A-Answer

"Before considering the specifics or detail of land disposal of sludge under the general guise of reclamation, a clear concept of the ultimate target objective is needed by the coal industry. Several questions arise--reclaimed for what purpose, i.e., reclaimed for recreation or hay and pasture land, or reclaimed for row crop farming, and reclaimed by and for whom?

Broad statements have been made about the need for reclaiming the thousands of acres of land scarred by strip mining, all this without full knowledge or appreciation of what is meant by reclamation. Take Fulton County as an example, much of the strip mine land has already been reclaimed and is in use for recreational purposes and as hay and pasture land. In view of some of the activities and statements, for example by the Metropolitan Sanitary District of Greater Chicago, is this reclaimed land now used for recreation to be further treated with sludge and turned into row crop farming land for the Federal feed, grain and wheat set aside program?

This raises an obvious economic question, whether more row crop farming land is needed in that area when already land has been taken out of cultivation. The coal industry realizes that the Corps has other advisory committees, such as the one on Conservation and Environmental Interests, and this naturally raises the question of whether the objective of further reclaiming land now used for recreation and land that could potentially be used for recreation be further reclaimed for row crop farming and whether this objective has the concurrence of the Citizens Advisory Committee on Conservation and Environmental Interests.

Questions which seemingly should be answered are: How much land should be reclaimed for recreation; how much for row crop farming; and currently, what's the most desirable use of either of these land uses in that area? Do we need more row crop producing farmland or more recreation? From the environmental standpoint alone, isn't the permanent cover of pasture and hay preferable to clean-tilled crop land.

Basically, surface-mined land and the water areas that are and can be increasingly created lend themselves far more readily to other important uses than row crop. It would likewise seem evident that present low to medium grade crop land can be more readily upgraded in productivity by the addition of sludge.

It is believed that some of these questions should be sorted out and clarified before we proceed in the detailed study of land disposal of sludge for the reclamation of land.

A: There are two general categories for land utilization of sludge. The first is a one-time strip mine application of 150 to 200 tons/acre for land renovation. The second is to apply sludge to agricultural fields as fertilizer in the amount of 10 to 13 tons/acre/year.

CM: What are the main uses of natural gases for the alternatives?

A: Gas is consumed primarily during incineration and lime reclamation.

CM: The difference in the environmental rating given the two existing standard alternatives are insignificant and preclude making a meaningful choice on this basis, especially since the accuracy of the ratings is questionable for such values.

A: A decision in this instance is difficult to make, but it can be done on the basis of considering all information available. The numbers shown were not the exact numbers given by the socio-environmental evaluation team, but rather reflects a normalization of the team's rating to unity for comparison purposes.

CM: What is the relationship between the unit values shown for the comparison of advanced biological plant alternatives, and those shown for the comparison of existing standards alternatives.

A: There is no relationship. Each comparison was developed and normalized to unity individually and independently.

CM: How much of the study is completed, and how much remains?

A: All contract work will be completed during the first year of study; currently about 9/12ths of this work has been finished. The study itself will be completed in March 1973.

CM: Will the results of this study be coordinated with other parts of the country?

A: No, each pilot study results is an individual conclusion.

CM: Will all pilot reports be forwarded to Congress concurrently?

A: Yes, they will be.

CM: What is desired or expected from this committee and in what form? Is an endorsement of particular alternatives expected?

A: The Corps desires the frank comments, suggestions, and expertise of members. For example, cost and recycling information from the steel and petroleum industries is most valuable. The position of the committee may be presented at the upcoming Steering Committee meeting which will afford the last opportunity to influence the choice of five final alternatives.

RESULTS OF HUMAN IMPACT RATING

An environmental rating (human factors) form (see Attachment II-1) was distributed prior to adjournment. The results are tabulated for three advisory committees on attachment II-2. The rating by the socio-environmental evaluation team is included as a basis of comparison.

Purpose: To establish the relative significance of each of the 19 factors below (in effect, to arrive at a priority order in which these human factors should be satisfied by a wastewater management system).

Instruction: Circle ONE number for each factor.

HUMAN FACTORS WEIGHTS

FACTORS	W E I G H T S						
	Extremely	Moderately	Slightly	Neutral	Slightly	Moderately	Extremely
	Insignificant				Significant		
1. Commercial Production	-3	-2	-1	0	+1	+2	+3
2. Industrial Production	-3	-2	-1	0	+1	+2	+3
3. Food Production	-3	-2	-1	0	+1	+2	+3
4. Construction Services	-3	-2	-1	0	+1	+2	+3
5. Public Service	-3	-2	-1	0	+1	+2	+3
6. Private Service	-3	-2	-1	0	+1	+2	+3
7. Residential Activity	-3	-2	-1	0	+1	+2	+3
8. Immigration	-3	-2	-1	0	+1	+2	+3
9. Population Density	-3	-2	-1	0	+1	+2	+3
10. Health and Safety	-3	-2	-1	0	+1	+2	+3
11. Employment	-3	-2	-1	0	+1	+2	+3
12. Income	-3	-2	-1	0	+1	+2	+3
13. Cultural/Educational	-3	-2	-1	0	+1	+2	+3
14. Public Finance	-3	-2	-1	0	+1	+2	+3
15. Recreation	-3	-2	-1	0	+1	+2	+3
16. Aesthetics	-3	-2	-1	0	+1	+2	+3
17. Ecosystem Status	-3	-2	-1	0	+1	+2	+3
18. Comm. Political Structure	-3	-2	-1	0	+1	+2	+3
19. Community Social Struct.	-3	-2	-1	0	+1	+2	+3

"HUMAN FACTORS" are activities or conditions comprising a wide range of factors affecting the well-being of the people in the study area; the desired degree of satisfaction and/or enhancement of these is a matter of informed judgement based on present conditions. For example, a score of +3 for a factor indicates that it is extremely desirable to enhance or reinforce that factor, say health and safety, while a score of -2 indicates that it is moderately undesirable to reinforce that factor, say immigration to the C-SELM area.

Attachment II-1

HUMAN FACTORS WEIGHTS

COMPARISON

ENVIRONMENTAL EVALUATOR TEAM (avg. of 14)

1.	Ecosystem Status	2.8
2.	Health & Safety	2.8
3.	Recreation	2.5
4.	Aesthetics	2.5
5.	Cultural/Educational	2.5
6.	Public Service	2.3
7.	Employment	2.2
8.	Private Service	2.0
9.	Income	1.8
10.	Public Finance	1.8
11.	Residential Activity	1.5
12.	Community Social Struct.	1.3
13.	Commercial Production	1.2
14.	Food Production	1.0
15.	Construction Services	.8
16.	Community Political Str.	.5
17.	Industrial Production	.3
18.	Immigration	- .2
19.	Population Density	-1.2

COMMERCE & INDUSTRY ADVISORY COMM. (sample, avg. of 6)

1.	Health & Safety	2.33
2.	Food Production	2.00
3.	Industrial Production	1.67
4.	Employment	1.50
5.	Income	1.50
6.	Public Finance	1.50
7.	Commercial production	1.33
8.	Community Political Str.	1.17
9.	Public Service	1.00
10.	Residential Activity	.83
11.	Recreation	.83
12.	Aesthetics	.83
13.	Ecosystem Status	.83
14.	Costruction Services	.50
15.	Private Service	.17
16.	Population Density	0
17.	Cultural/ Educational	- .33
18.	Community Social Struct.	- .83
19.	Immigration	-1.00

LOCAL PLANNING ORGANIZATIONS AND SANITARY DISTRICTS (avg. of 4)

1.	Public Finance	2.00
2.	Health & Safety	2.00
3.	Recreation	1.75
4.	Population Density	1.75
5.	Residential Activity	1.67
6.	Public Service	1.50
7.	Aesthetics	1.33
8.	Private Service	1.00
9.	Industrial Production	1.00
10.	Community Political Str.	1.00
11.	Construction Services	.67
12.	Ecosystem Status	.67
13.	Food Production	.50
14.	Commercial Production	.50
15.	Income	.50
16.	Comm. Social Structure	.50
17.	Cultural/Educational	0
18.	Employment	-1.00
19.	Immigration	-1.00

AVERAGE OF ALL THREE SCORES

1.	Health & Safety	2.38
2.	Public Finance	1.77
3.	Recreation	1.69
4.	Public Service	1.60
5.	Aesthetics	1.55
6.	Ecosystem Status	1.43
7.	Residential Activity	1.33
8.	Income	1.27
9.	Food Production	1.17
10.	Private Service	1.06
11.	Commercial Production	1.01
12.	Industrial Production	.99
13.	Employment	.90
14.	Community Political Str.	.89
15.	Cultural/Educational	.72
16.	Construction Services	.66
17.	Comm. Social Structure	.32
18.	Population Density	.18
19.	Immigration	- .73

Attachment II-2

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

PART I - SECTION V

CITIZENS ADVISORY COMMITTEE
Local Planning Organizations and Sanitary Districts
(Summary - Fourth Meeting)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

13 September 1972

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Preface

On 13 September 1972, members of the Advisory Committee for Local Planning Organizations and Sanitary Districts met with U. S. Army Corps of Engineers, Chicago District personnel for the fourth in a series of meetings for the Chicago-South End Lake Michigan Wastewater Management Study. The committee is one of several advisory committees participating in the public involvement and participation program for the study.

The meeting was held at the Everett M. Dirksen Building, 219 South Dearborn Street, Chicago. The thrust of the meeting was to advise the Corps at a critical decision making point in the study, the selection of final alternatives from the alternatives presented at the third meeting.

A list of participants and a summary of comments by committee members during and subsequent to the presentation, is presented herein.

PART I - SECTION V

Advisory Committee for Local Planning Organizations and Sanitary Districts

<u>Organization and Representative</u>

Mr. John M. Harvat (Chairman)
Illinois Assn. of Sanitary Districts

Mr. Ben McEwan
Downers Grove Sanitary District

Mr. Elber Maiden
Lake County Regional Planning Commission

Mr. Stuart J. Kennedy
Wheaton Sanitary District

<u>Corps of Engineers Personnel</u>

Major Leroy R. Hayden
Mr. Imre Szekelyhidi
Mr. W. Henry Sanders, III
Mr. Milo Ryan

<u>Consultant to Corps</u>

Dr. Donald Matschke
Bauer Engineering, Inc.

Comments and Discussion

CM: Is the Addendum (provided all members) to the C-SELM Progress Report No. 3 a reflection of the current program of the Metropolitan Sanitary District of Greater Chicago (MSD)?

A: No, the current MSD program is for sludge application in Southern Illinois. The Addendum reflects a maintenance of the 64 treatment facilities identified by plans of the Northeastern Illinois Planning Commission and the Lake-Porter County Regional Transportation and Planning Commission. Wastewater would be provided secondary treatment at the facilities and then transported to land sites for advanced treatment. The secondary treatment plants would not meet existing State standards. MSD has not contemplated such a system.

CM: The 41 plant system is the most reflective of the thoughts of the committee and the least objectionable to the status quo for either advanced biological or physical-chemical treatment.

The 41 plant system is favored primarily because of its correlation to existing facilities. It is consistent with the current and projected expenditures by sanitary districts to upgrade their facilities. These districts are concerned with the present, and cannot envision a radical change (eg., to 17 plants).

CM: Although there is great doubt about the viability of a land system, the concept should be retained in the group of final alternatives.

CM: What was the rationale for tentatively choosing the 17 plant biological as opposed to the 41 biological plant system?

A: The emphasis for selection was on the socio-environmental ratings and the cost. Although many other factors were evaluated, for example the final quality of the treated water, these factors were essentially the same amongst alternatives and hence did not provide a basis for discrimination. For advanced biological systems, the 17 plant was the least costly. This factor was important in the selection.

When the final five alternatives are presented, the institutional impacts will be identified. These impacts should be of great interest in providing a further basis for selection.

CM: The study seems to be biased towards a land system and predisposed to a recommendation that the living filter system is the most practical; but for purposes of evaluation it should be retained. The merits of each technology can be debated later on.

CM - Committee Member, A-Answer

A: Selection of the five tentative alternatives was for just this purpose, to retain each technology for further study. The selection provides the flexibility to evaluate concerns that members may have with a particular technology or number of treatment facilities.

CM: There is concern that the particular reasoning for the study (regional approach) will become a standard for the entire State. Locales in other parts of the State could not cope with such a standard. In these areas there is a completely different set of circumstances, a different type of environment, and an entirely different physical layout.

A: There is no intention of developing such a standard, nor has it ever been intimated that the results of the study would be useful to any but the study area. Only the general knowledge of the various technologies gained by performing the study can be applied elsewhere.

CM: The concept of a living filter system in a highly productive farm area is very disconcerting. There is concern that this type of program will be adopted by others and then generalized as being some sort of panacea for wastewater management problems. There is also concern about the number of plants to be retained in the study area because the chosen system would affect the economic and social structure of the affected areas.

A: It is agreed that, if the individual sanitary districts and sewage treatment plant operators worked and planned on an individual, autonomous basis, each would probably utilize treatment plants; but conversely, the study has undergone a rigorous analysis which indicates that, due to socio-environmental and cost implications, the land treatment system should be given further consideration. The institutional considerations that will be addressed for the final five alternatives will identify and assess the impact of many of the present concerns.

CM: Why was the amount of stormwater to be collected not varied to obtain the effects of different degrees of collection?

A: The amount of stormwater to be treated has been optimized for the NDCP* standards, and this is the basis for the specified amount. A greater degree of treatment would begin to jeopardize the cost effectiveness of the system and result in a foolish expenditure of money. A lesser degree of treatment would mean tampering with the treatment effectiveness of the system, since stormwater sources of pollutants would become much more significant under NDCP. There would then be no point in providing NDCP standards if stormwater were allowed to go untreated to a lesser degree and thereby continue to degrade the water.

*No Discharge of Critical Pollutants

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

STAGE IV - PART 2

PLAN FORMULATION PUBLIC MEETINGS

(Summary)

14 , 18 September 1972

PREFACE

The U. S. Army Corps of Engineers, Chicago District, conducted the second set in a series of Public Meetings concerning its wastewater management study for the Chicago-South End of Lake Michigan Area.

Two meetings were held. The first was held on 14 September 1972 in Hammond, Indiana, primarily for the residents and interested organizations of Indiana. The second meeting was held 18 September in Chicago, primarily for the residents and interested organizations of Illinois.

A list of the 5,700 to whom a notice was sent and a complete attendance list are on file in the Chicago District. An informational brochure entitled, "Water, Our Many Splendored Inheritance. How Can We Most Enjoy It?" was also furnished to all known interested parties. The brochure summarized the eleven alternatives under study. This information was provided prior to the meeting not only to inform the public of study progress, but also, and more importantly, to solicit public views and opinions on the alternatives pursuant to reducing the number of alternatives to be further studied.

The results of the two meetings are summarized herein. The first section summarizes the presentation given by the Chicago District at both meetings. The second section summarizes the written and verbal testimony received from an excess of 1,200 citizens at the Indiana meeting. Section III summarises the verbal and written testimony received from over 200 residents at the Illinois meeting.

STAGE IV - PART 2

TABLE OF CONTENTS

PART 2 - SECTION 1

CORPS OF ENGINEERS PRESENTATION

Colonel Richard M. Wells, District Engineer, Chicago, began the meeting by welcoming the audience to the second public meeting for the Chicago-South End Lake Michigan Wastewater Management study. Colonel Wells introduced other Corps of Engineers personnel and dignitaries in attendance, explained how the meeting would be conducted, and explained that the meeting would consist of three parts; (1) a briefing on the study, its goals, status and the alternatives thus far developed; (2) presentation of statements and comments from the audience; and (3) a discussion and question-answer period. He briefly described the topics he would cover, shown on the table of contents. Following is a summary of the briefing that was given.

Attachment 1 shows the C-SELM area which includes the area between Lake Michigan and the broken line. It includes the areas draining into Lake Michigan shown in black and the drainage basins of the Chicago, Des Plaines and Little Calumet Rivers. Portions of four Illinois counties and three Indiana counties fall within this area.

AREA TRENDS AND NEEDS

Attachment 2 illustrates trends in the C-SELM area. The population is projected to grow from approximately 7 million people in 1970 to 9 million in 1990 and 11 million in 2020. With this increase in population the urban area shown in black will grow from 18 percent of the total area in 1970 to 22 percent in 2020; the suburban area shown in white will grow from 14 percent in 1970 to 42 percent in 2020 and the rural area shown shaded will shrink from 68 percent of the total area in 1970 to 36 percent in 2020. Correspondingly, the domestic and commercial water needs of the area will grow from one billion gallons per day in 1970 to 1.7 billion gallons per day in 2020.

STUDY GOALS

Considering these trends, the Chicago District is conducting the C-SELM study within the framework of the major land and water needs of the study area. These needs include water quality improvement, flood control, municipal and industrial water supply, fish and wildlife conservation, commercial navigation, recreational boating, general recreation, the preservation and enhancement of the environment, and the well being of society.

The two goals of the C-SELM study are formulated to contribute to meeting these needs. These goals are (1) to develop wastewater management systems that can be employed to control water quality and quantity in the area's waterways, and (2) to develop a balanced program to restore, preserve and utilize the area's resources to meet the nine needs which I outlined. For example, this program will include water reuse to meet water supply needs and to maintain the stream flows required for fish and wildlife, navigation and recreational boating. Furthermore, it will detail open space and greenbelt concepts aimed at preserving and enhancing the environment, meeting general recreational needs, and improving social well-being.

RESOURCE PROGRAM

As a first step in developing the program, we are preparing a prototype study for the section of the North Branch of the Chicago River between Half Day Road and the junction of the river and the North Shore Channel. Our concept includes the control of the flood plain usage by acquisition, restrictive easement, and zoning. As shown on the map on (attachment 3), a near continuous greenbelt zone is recommended consisting of existing public lands, suggested purchase of new lands in the areas, and restrictive easements running along the river banks.

The prototype concept also calls for the restoration and preservation of the land and aquatic environment and the provision of diversified recreational activities within this greenbelt (see attachment 4). These recreational opportunities would include hiking, cycling and nature trails; bank fishing along the river; and development of the larger areas to include facilities for boat launching, picnicing, summer and winter games, and vehicular access and parking. The North Branch is potentially a very beautiful stream.

In the second phase of program development, we will finalize the Prototype Study, extend this study to the major C-SELM streams, and identify a plan for open land corridors connecting the river greenbelt corridors.

ALTERNATIVE WASTE WATER MANAGEMENT SYSTEMS

As mentioned earlier, the second study goal is to develop alternative wastewater management systems to meet the area's needs. The following approach was used in developing these systems.

APPROACH TO DEVELOPMENT

The Chicago District began by developing and evaluating 19 initial systems for the year 2020, which were then screened to eliminate the least promising systems to produce 11 intermediate alternatives for more detailed design and evaluation. These eleven alternatives will be screened subsequent to the second public meetings. The five most promising alternatives which emerge out of this screening will be designed and evaluated in greater detail. Each alternative will then be presented in a draft report.

Throughout this process we are keeping a Governmental advisory committee and several citizen advisory committees informed concerning our progress (see attachment 5). In turn we are receiving from them their frank comments and input of ideas.

Three sets of public meetings will be held in both Illinois and Indiana during the study. The first set were held near the beginning of the study. The present meetings constitute the second set of meetings. The ideas that we receive from the audience at this meeting will be used as input to our screening process. In about four months the third meeting will be held. At this time we will present the findings in a draft report.

DEVELOPMENT CONSIDERATIONS

In developing these alternative systems, we are considering two different water quality standards. The first is the achievement of existing Federal and State standards. The second is the production of treatment plant effluent that meets the "no discharge of critical pollutants" standard that is currently being considered by the U. S. Congress. By this standard we mean achieving a level of critical pollutants that is equivalent to the level that would be found naturally in the area's waters if no pollution was taking place. Attachment 6 identifies the specific constituent levels that meet this standard.

TREATMENT TECHNOLOGIES

To achieve the "no discharge of critical pollutants standard", we have identified three alternative advanced treatment technologies. These include the advanced biological and the physical-chemical treatment plant technologies, and the land treatment technology. All three technologies can achieve the "no discharge of critical pollutants" standard. Each is described below.

Advanced Biological.

The advanced biological system employs natural processes controlled in treatment plant components to purify the incoming conbined industrial, municipal and storm wastewater (see attachment 7). It first employs conventional primary and secondary treatment which includes gravity separation of solids in clarifiers, aerobic oxidation of organic wastes in aerators (ie, a process by which microorganisms decompose, or consume, solids in the presence of oxygen) and further separation of solids in other clarifiers. The solids produced are heated and undergo anaerobic oxidation in digestors (ie, microorganisms decompose, or consume the solids in the absence of oxygen) to produce solid material which is removed and is suitable for application to the land as a fertilizer. The conventional secondary treatment of the remaining liquids is followed by a nitrification-denitrification process in which ammonia is converted by bacteria to nitrogen gas; a lime precipitation treatment to remove phosphorus and solids; a carbon filtration process to remove additional fine particles; and a conventional sand filter, chlorination and aeration prior to transport to water reuse destinations. Partial incineration processes are used in reclaiming lime and carbon. Additional sludge produced in the nitrification-denitrification and lime precipitation processes is also applied to the soil.

Advanced Physical-Chemical.

The physical-chemical system employs physical and chemical processes to achieve the results produced by bacteria in the advanced biological system (see attachment 8). Initially it employs two processes included in the advanced biological system--lime precipitation of phosphorus and solids, and carbon adsorption of suspended and dissolved solids. As with the biological system the lime and carbon are reclaimed and the sludge produced is suitable for use as a soil conditioner.

Ammonia is then removed by a natural zeolite mineral in an ion exchange process. Following this, the effluent passes through a sand filter, and is chlorinated and aerated prior to return for reuse.

Land Treatment.

In the land treatment system, wastewater is first pumped into aeration lagoons where organic material is oxidized (ie, broken down). The wastewater then flows to storage lagoons where it is retained for long periods to allow suspended solids to settle to the lagoon bottoms. Periodically, these solids are removed with a hydraulic dredge and applied to the land (see attachment 9).

The effluent leaving these lagoons is equivalent to that produced by conventional secondary treatment plants. It is chlorinated, detained long enough to allow the chlorine residual to drop to acceptable levels, and then applied to the land with spray irrrigation rigs. Advanced wastewater treatment is achieved as the wastewater percolates down through the "living soil filter." The water is then collected in an underdrain or well system, aerated, and transported to reuse areas.

The advanced treatment achieved by the soil column or living soil filter is described by attachment 10. Treated wastewater percolates down through the soil where earth particles adsorb pollutants and viruses and mechanically strain out suspended solids; soil bacteria consume dissolved organic nitrogenous and phosphorus materials; and root systems take up soluble nutrients.

Sludge Management.

Sludge management is a common element of all the alternative systems. Fortunately, the properties of the sludge enable its beneficial use as we return the component elements of the sludge to the land. Two sludge management options are considered by the study. The first is land reclamation of areas such as the strip mined terrain shown in attachment 11. The second is agricultural use as fertilizer as illustrated by the comparison of corn grown with and without sludge application.

DESCRIPTION OF ALTERNATIVES

Eleven alternative systems have been developed. The first two alternatives, A and B, are designed to achieve existing Federal and state water quality standards. Alternative A is a composite of the existing regional plans which envision 64 treatment plants in 1990. Alternative B is an optimized plan that includes 41 treatment plants and some additional water reuse over that included in the regional plans.

The remaining nine alternatives are designed to achieve the "no discharge of critical pollutants" effluent standard. These alternatives include the common elements of nearly total collection and treatment of rural, urban and suburban stormwater; use of the additional collected and treated stormwater to satisfy all needs for municipal, commercial and industrial water supply, stream flows required for recreation, fish and wildlife and navigation, and groundwater recharge; and concurrent achievement of flood control through stormwater collection.

Stormwater collection and treatment concepts have been developed for urban, suburban, and rural areas.

The rural stormwater management concept is illustrated by attachment 12. It includes the construction of 100 acre detention ponds in minor tributaries and draws of the regions streams. Overland runoff is directed to and collected in these ponds. Next it is pumped to irrigation rigs on nearby agricultural lands where it is purified by the soil, collected in underground drain or well systems, and then transported to reuse areas. These ponds can also serve a dual purpose as recreation areas.

The suburban stormwater management concept is illustrated by attachment 13. Suburban runoff is collected in a dispersed system of surface ponds or covered underground pits, depending on the availability of real estate. From these storage areas, it is pumped to access points where it is combined with sanitary waste and then conveyed to treatment plants or land treatment sites. Recreational pursuits such as picnicing can be enjoyed at the open ponds while the covered sites can be developed as athletic facilities.

In the urban areas, stormwater is collected in a combined sewer system and stored in pits or underground tunnels (attachment 14). From these storage areas, the combined wastewater is pumped to treatment plants or land sites.

In nine alternatives which meet the "No Discharge of Critical Pollutants" standard the following water balances are maintained (see figure 15). A balance between the quantity of rural stormwater collected and treated and the quantity released as flow to Lake Michigan, groundwater resupply, streamflow augmentation and input to water treatment plants; a balance between the quantity entering water treatment plants from rural stormwater, groundwater and Lake Michigan and the resultant quantity appearing as used water load to treatment facilities and as runoff from activities such as lawn watering; a balance between the quantity of urban and suburban stormwater, and municipal and industrial wastewater entering treatment facilities and the water returned to Lake Michigan or used to augment stream flows. In all cases, diversion of water from Lake Michigan is held below the Supreme Court limitation and stream flows are maintained at desirable levels.

The foregoing describes the common elements of the nine "No Discharge of Critical Pollutants" alternatives. The differences are described below.

Alternatives C, D, E and F employ 64, 41, 17 and 8 treatment plants, respectively. Each alternative includes an option in which all plants are advanced biological and an option in which all plants are physical-chemical. (See attachment 16.) Alternative G employs a combination of 12 physical-chemical plants with 5 advanced biological plants. The five advanced biological plants are located at the sites of the Gary and Hammond plants and the Metropolitan Sanitary District's Calumet, West-Southwest and North Side plants.

Alternative H employs a single land treatment site south of the Kankakee River in Indiana and Illinois (attachment 17). Alternative I employs six dispersed land treatment sites: one below the Kankakee River in Indiana, a Kankakee-Will-Grundy County site, a Kendall County site, and three McHenry County sites (attachment 18). Alternative J employs the five advanced biological treatment plants included in Alternative G plus smaller versions of the six dispersed land sites included in Alternative I(attachment 19). Alternative K employs the same six dispersed land sites in combination with existing and newly purchased open space areas (attachment 20). These open space areas would be used for daytime recreation and controlled night time irrigation with suburban and rural stormwater, In this way two needs can be served with the same land.

Another combination considered in the study is the collocation of land treatment sites and power plants (see attachment 21). Water in the storage lagoons of the treatment facilities can be used to dissipate waste heat from the power plants. Additionally, this water can be transferred to storage vaults located deep underground passing through turbines to generate power in peak power demand periods and then be pumped back up during low power demand periods. This technique is called pump-storage power generation.

A total integrated land treatment and area development concept might include aeration and storage logoons located adjacent to power facilities; irrigation of farm lands with the chlorinated secondary effluent coming from the lagoons; buffer zones around the lagoons and other areas devoted to wildlife; individual farms and villages; and development of commercial parks or industries sharing the area's treatment and power facilities.

The eleven alternatives are summarized on attachment 22.

COMPARISON OF ALTERNATIVES

The eleven alternatives may be compared by discussing the social, economic, and environmental factors including resource requirements; and the impact of the alternatives on the waterways, the air and the land. Institutional concerns and relative system costs provide a further basis for comparison.

Social Economic and Environmental Impacts.

Attachment 23 identifies resource requirements for existing standards Alternatives A and B, treatment plant Alternatives C through F with all advanced biological and all physical-chemical options, combined treatment plant Alternative G, land treatment Alternative H, I and K and combined land and advanced biological treatment plant option J.

Electricity requirements measured in megawatt-hours per day are lowest with the existing standard alternatives--3,000 - 3,400; three to four times higher with the advanced treatment plant alternatives--10,500 to 11,400; and doubled again with the land treatment alternatives--23,000 to 26,000. The combination of plants and land treatment is somewhat higher than with plants alone. In each case, as the number of treatment sites is decreased, the longer water conveyance distances entail higher power requirements.

Chemical requirements measured in tons per day are very low with the existing standards and land treatment alternatives. The highest quantities are needed by the physical-chemical systems--2,600 tons per day--and lower but significant quantities are needed by the advanced biological plants--1,500 tons per day.

Ninety million cubic feet per day of gas are required in the advanced treatment plant systems while essentially no gas is required by the existing standard or land systems. With combined land and plant treatment, gas requirements are reduced to 81 million cubic feet per day.

Attachment 24 illustrates the comparative impact on the area's waterways of the alternative systems. Levels of phosphate and ammonia nitrogen are shown as an example since excess levels of these constituents contribute to algae bloom, lake eutrification, and unsightly appearance of waterways. With the existing standards systems, 31,000 tons per year of phosphates and 29,000 tons per year of ammonia nitrogen reach the area's waterways, while with all advanced systems the quantities discharged approximate the natural background levels of these constituents in the waterways. The phosphate level discharged

with the land system is about one-tenth that of the advanced treatment plant systems. Dissolved solid levels discharged to the waterways are reduced somewhat with advanced treatment, from 5,100 to 4,400 tons per day. This level is not considered to constitute either a short or a long range problem.

The great reduction in pollutants discharged in the waterways with the higher standard systems will have strong positive impacts on recreation, aesthetics, and ecosystem status conditions throughout the region. Much of this gain stems from the near total capture and treatment of stormwater with the high standard systems. Concurrently, this additional stormwater capture will significantly reduce the flooding which would continue to be a problem with the existing standard systems.

Attachment 25 illustrates the comparative impact on the air of the alternative systems. The greatest negative impact is created with the incineration processes in the physical-chemical plants. These plants release 250 tons of oxides of nitrogen, 11 tons of oxides of sulfur, and 225 tons of particulates to the air each day. These pollutants return to the land and waterways in rainfall. They also constitute a waste of the natural nutrients that are destroyed by incineration.

The advanced biological plants produce lesser amounts of oxides of nitrogen and sulfur and equivalent levels of particulate matter. Practically none of these pollutants are released by the existing standard and land alternatives.

The figures presented here do not include the air pollutants that may be produced by supporting power plants. You will recall that the land systems were the greatest consumers of power. Aeration facilities and irrigation rigs produce an aerosol spray in the air. The quantities are greatest with the land systems, low with the conventional and advanced biological systems and not present with physical-chemical systems. The irrigation water is chlorinated prior to spraying which eliminates health hazards. Furthermore, these systems are designed with low spray pressures to reduce the amount of aerosol spray produced.

Nutrients, organic compounds and minerals are moved from our nation's farms and orchards to our cities in the form of agricultural products (attachment 26). An ideal land resource balance is achieved when these resources are returned to the land where they can once again be used. We consider two means of making this return. These include sludge application to the land and rural stormwater and combined wastewater

irrigation. We cannot afford to lose these resources to the air or to the waterways as pollution. This pollution represents resources out of place. These resource return processes are addressed below.

All wastewater treatment processes produce sludge. Sludges from the conventional and advanced biological and the land treatment systems improve soil fertility and structure. They are particularly useful from an environmental standpoint in land reclamation although the transportation costs with this utilization are greater than for agricultural applications. Physical-chemical sludges can be used to reduce soil acidity. As noted before, their nutrient value is lost during the partial incineration process. The irrigation systems employed in land treatment are designed to provide maintenance of well drained soils by the underdrain system; crop fertilization by nutrients and organic materials in the wastewater; guaranteed crop watering during dry and drought periods; improvement in soil fertility and structure; and continual monitoring to prevent excessive buildup of undesirable constituents and to insure unlimited crop production life.

All "no discharge of critical pollutants" alternatives include irrigation of rural stormwater in separated areas totaling 101,000 acres. This area is scaled down to 81,000 acres in Alternative K where rural and suburban stormwater is applied to 218,000 acres of open space. See attachment 27. (No irrigation is included in the existing standards alternatives.)

The areas receiving treatment with combined wastewater vary depending upon the specific nutrient requirements of the crops planted on these lands. For example, with pure land treatment Alternatives H & I, irrigation areas vary between 328,000 and 525,000 acres. The use of open space in Alternative K reduces these figures slightly while the Alternative J combination of land with five advanced biological treatment plants reduces these values to between 89,000 and 142,000 acres.

The lands required in these alternatives for lagoons, buildings and buffer zones are shown on attachment 28. Approximately 42,000 acres are required for the storage of rural stormwater. The land sites in Alternatives H, I and K require approximately 76,000 acres while 20,000 acres are required in Alternative J in conjunction with the advanced biological plants. Thus from 12 to 19 percent of the land at these sites is committed to non-agricultural use. The land areas required for lagoons, buildings and buffer zones are repeated on this attachment along with the lands required for similar purposes in the treatment plant alternatives.

Additional lands required for storm and combined wastewater storage are indicated with the bar extensions. These lands include 600 acres of combined storage in urban areas for all alternatives plus 20,000 acres of suburban stormwater storage and 42,000 acres of rural stormwater storage in all alternatives except the existing standards alternatives. Thus, the rural lands required for facilities and storage are nearly three times greater for the pure land alternatives than for the advanced treatment plant alternatives. On the other hand, these treatment plant alternatives would occupy considerably more land in the densely populated urban areas than is required with the land alternatives.

These facility and storage area requirements represent the real impact of the alternatives on the land, since they represent areas dedicated to wastewater treatment and not producing useful crops. However, through synergisms, such as the collocation of power plants and the use of buffer zones for wildlife, some double use can even be obtained from these areas.

Institutional Impacts.

The impacts of existing wastewater management organizations produced by the alternative systems provide a further basis for comparison. These impacts increase as the degree of regionalization employed in the alternatives increases (see attachment 29). In other words, progressively greater impacts are encountered as one moves from the present 132 plant system to the 64 plants in Alternatives A and C, to the 41 plants in Alternatives B & D, to the 17 plants in Alternatives E and G and to the 8 plants in Alternative F. Even greater changes are entailed with the land alternatives as only 5 plants are retained in Alternative J and no plants in Alternatives K, I and H which employ progressively more centralized land systems.

The impacts stemming from this regionalization include the need to abandon some existing facilities with assumption of their debt and possible reduction of the functions of some institutions. In turn, this requires an increase in the scope of operations and in the capital and operating costs of other institutions. Regionalization also causes geographic shifts in some wastewater job locations. It will create a need for cooperative arrangements between institutions sharing collection, conveyance, storage, treatment and sludge disposal facilities and between states sharing system components as occurs with several of the land alternatives. Finally, it may produce a need to create new institutions.

Enabling state legislation may be required to authorize existing institutions to expand the geographic limits of their service and operations; to expand their financing capabilities and debt ceiling; and to take on new functions such as the operation of recreational facilities as open space, storage and treatment sites, and the provision of water for municipal and industrial use. Legislation may also be required to create new wastewater management institutions, establish non-structural measures benefiting all systems such as phosphate controls, and to establish interstate agreements.

Costs.

All alternatives involve increased costs as shown on attachment 30. The chart compares the total annual costs developed for each of the alternatives with separate bars shown for the physical-chemical and advanced biological options developed for Alternatives C, D, E and F. Costs without stormwater treatment over that stormwater collection envisioned with existing plans are shown in black with stormwater add-on costs shown with the bar extensions.

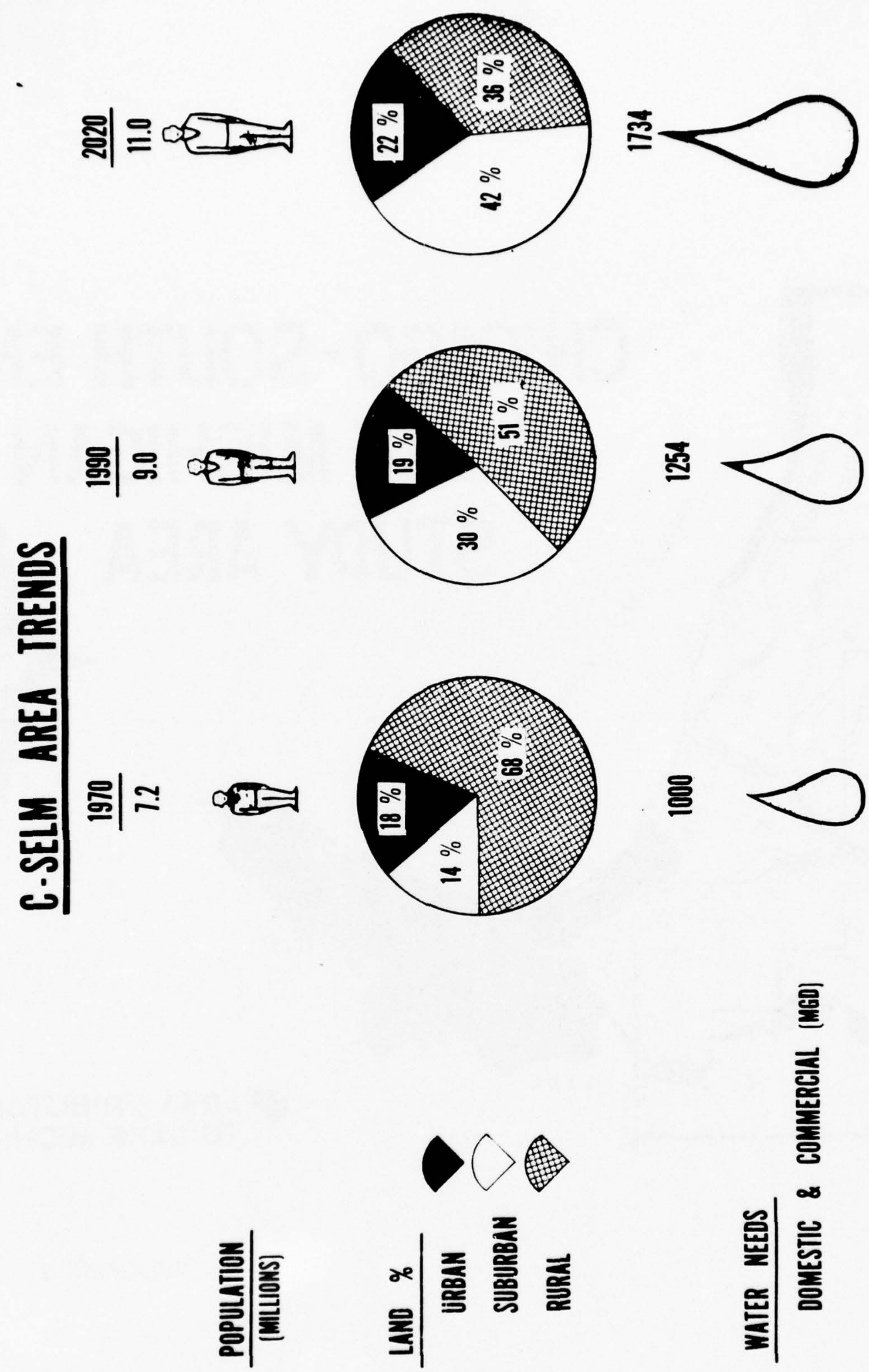
The existing standard alternatives are the least expensive and are nearly equal in cost. In Alternatives C through F, the physical-chemical options all cost less than their corresponding biological plant options. Alternative E with 17 plants is the least expensive of the treatment plant alternatives for both the biological and the physical-chemical plant options. Alternative G with a combination of 5 biological and 12 physical-chemical plants is intermediate in cost between the physical-chemical and biological options in Alternatives C through F.

Land Alternatives H and I are significantly less costly than any of the other "no discharge of critical pollutants" alternatives. Six site Alternative I costs approximately $11 million more than single site Alternative H. Combined Plant and Land Alternative J approaches the pure plant alternatives in cost. Alternative K with the multiple use of open space and full stormwater treatment costs approximately $154 million more per year than the corresponding six site Alternative I. However, considerable additional recreational and environmental benefits are achieved with this alternative.

We have developed initial estimates of power add-on savings with combined use of land sites amounting to approximately $200 million per year. These savings would reduce the cost of land Alternatives H and I to levels approximately equal to the existing standard alternatives.

This concluded the initial presentation.

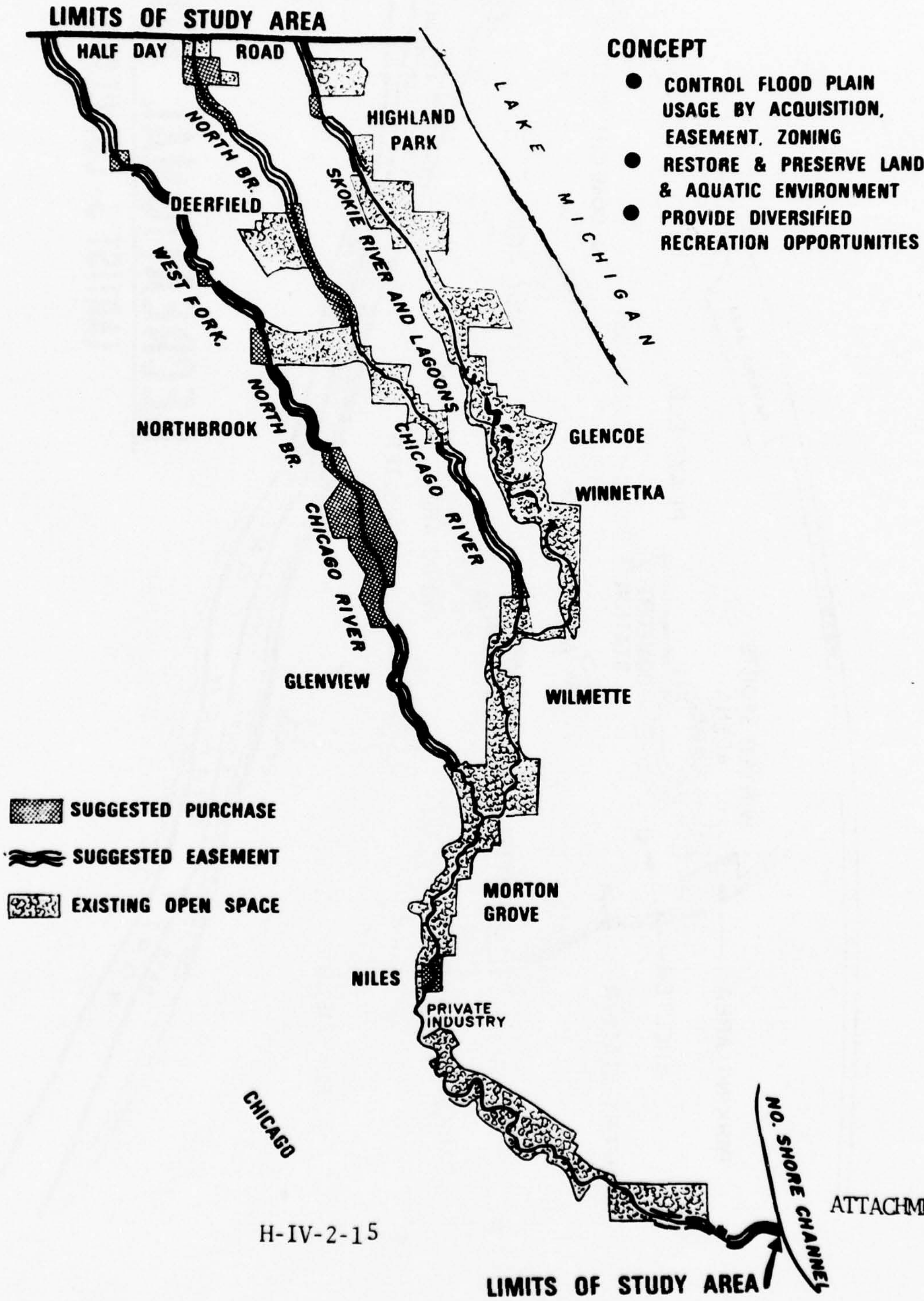
ATTACHMENT 1



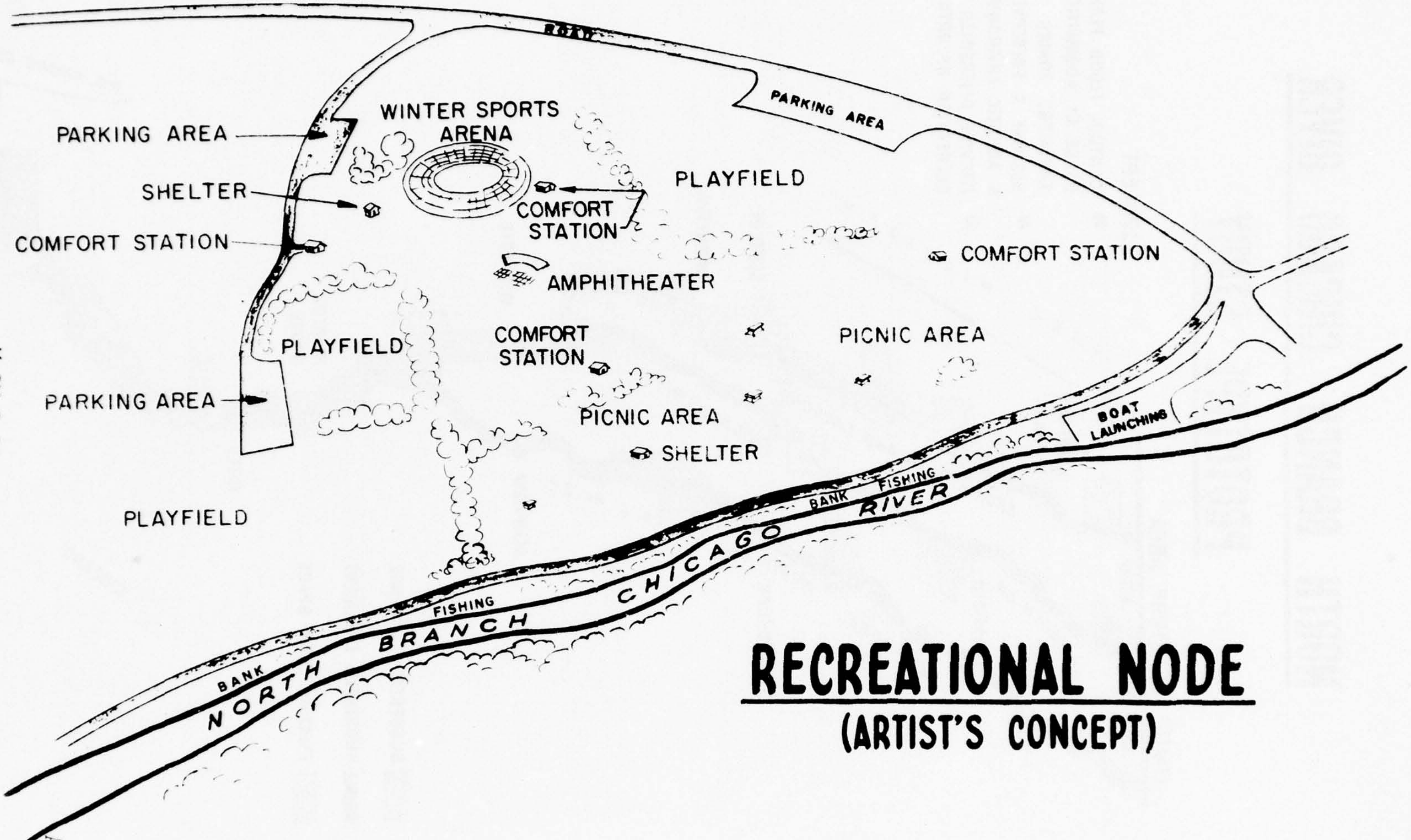
ATTACHMENT 2

NORTH BRANCH, CHICAGO RIVER

PROTOTYPE STUDY



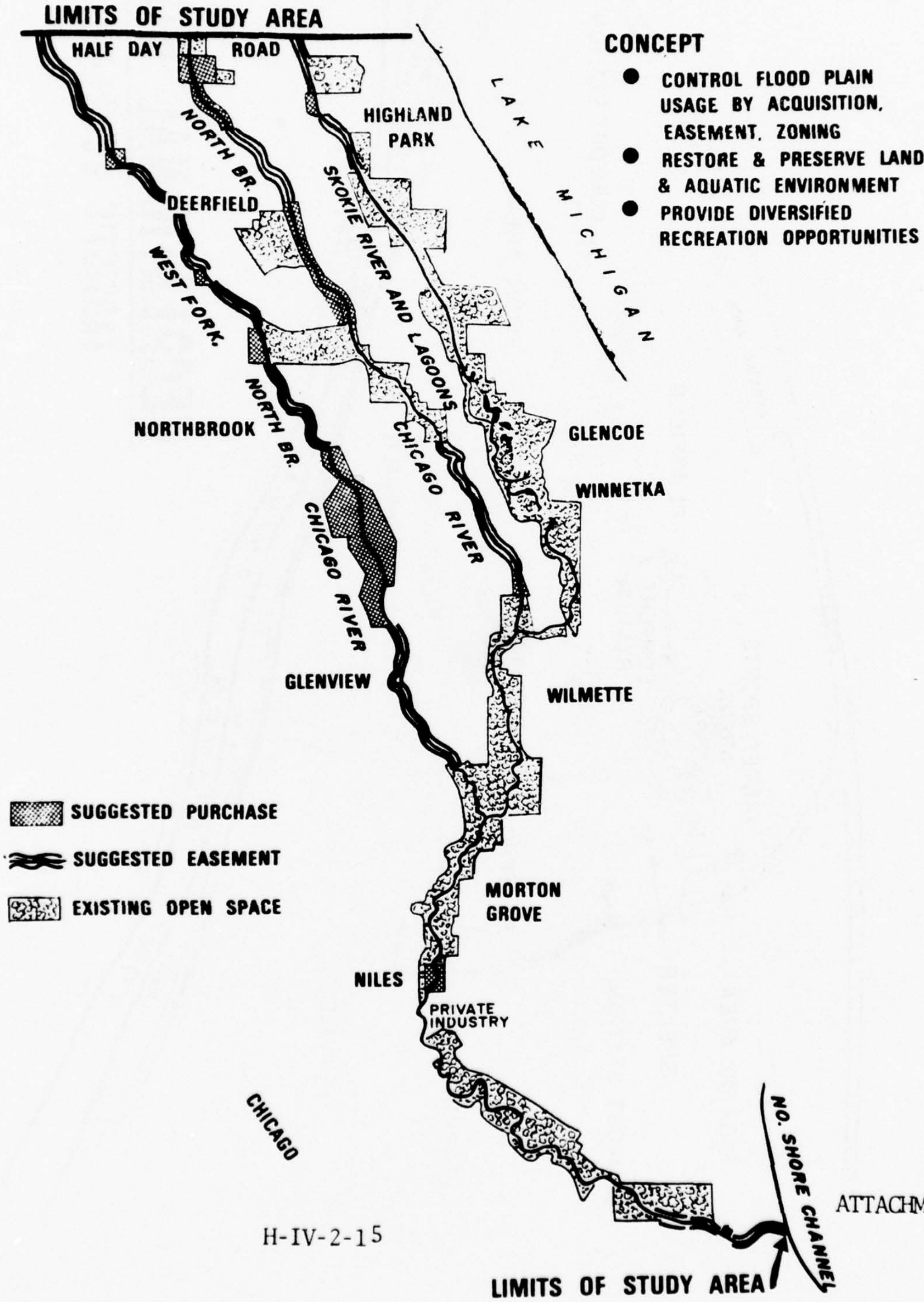
ATTACHMENT 3



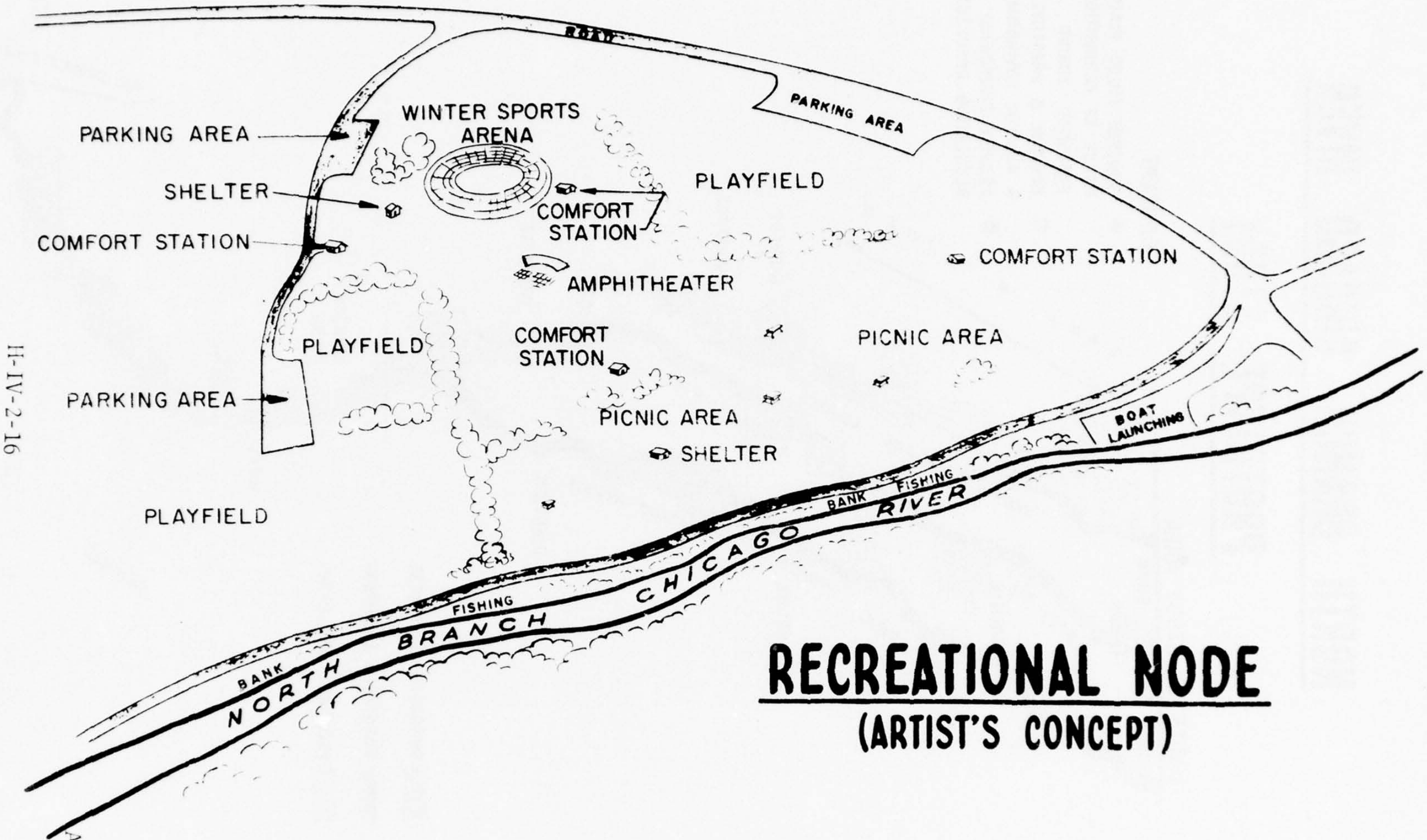
RECREATIONAL NODE
(ARTIST'S CONCEPT)

ATTACHMENT 4

NORTH BRANCH, CHICAGO RIVER
PROTOTYPE STUDY



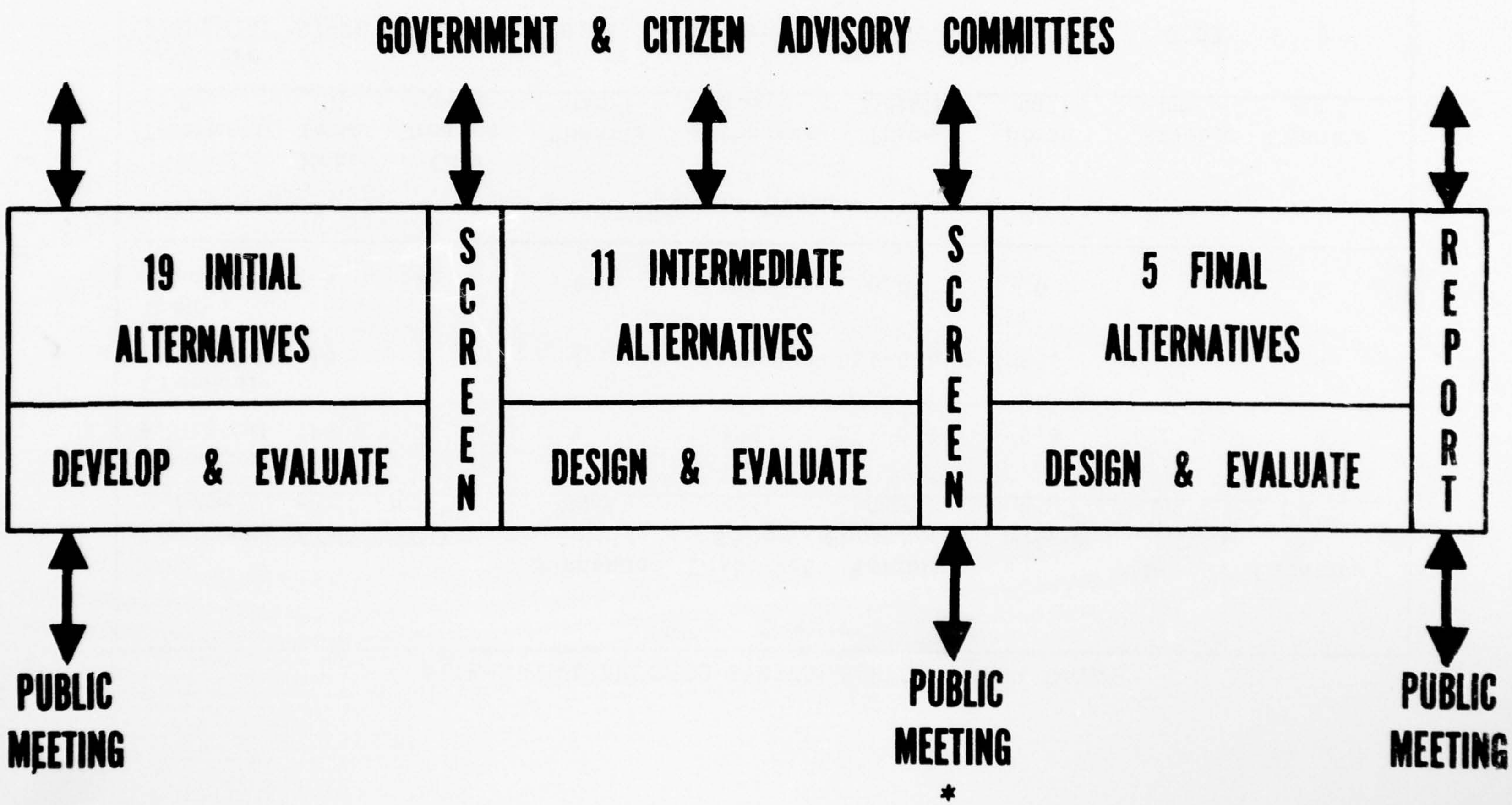
ATTACHMENT 3



RECREATIONAL NODE
(ARTIST'S CONCEPT)

ATTACHMENT 4

APPROACH TO DEVELOPMENT OF ALTERNATIVE WASTEWATER MANAGEMENT SYSTEMS



ATTACHMENT 5

ALTERNATIVE PROCESS SYSTEM PERFORMANCE DATA

Treatment Type	COD mg/l	BOD mg/l[5]	Suspended Solids mg/l	Dissolved Solids mg/l	Soluble Phosphorus mg/l	NH_3-N mg/l	NO_3-N NO_2-N mg/l	Organic N mg/l
	Effluent Quality							
Advanced Biological	10	3	1	350	0.1-0.2	0.3	2-5	0
Chemical-Physical	10	3	1	350	0.1-0.2	0.5	2	0
Land Treatment	6	2	0	400	0.01	0	2	0

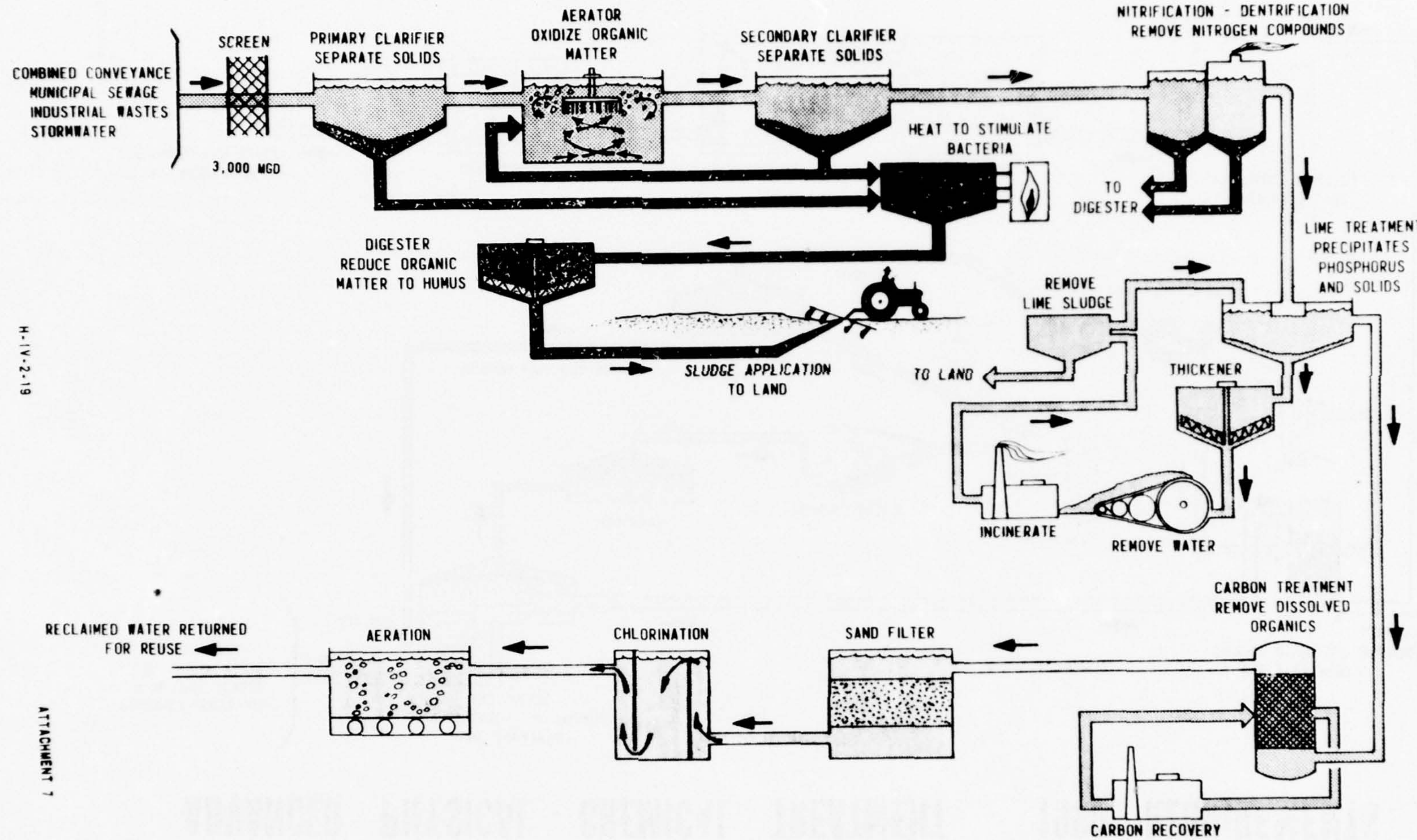
Treatment Type	Heat, Temp. °F	Oils Greases mg/l	Phenols mg/l	Pathogens, Viruses	Trace Metals*	Boron mg/l	Arsenic mg/l	Cyanide mg/l
	Effluent Quality							
Advanced Biological	53-78	1	0.01	Present**	0.1	1.0	0.03	0
Chemical-Physical	53-78	1	0.01	Present**	0.1	1.0	0.03	0
Land Treatment	55-70	0	0	0	0	0	0	0

*Trace Metals: Aluminum, Cadmium, Chromium, Copper, Lead, Nickel, Zinc, Iron, Manganese, Mercury

**Present with Current Disinfection Practice.

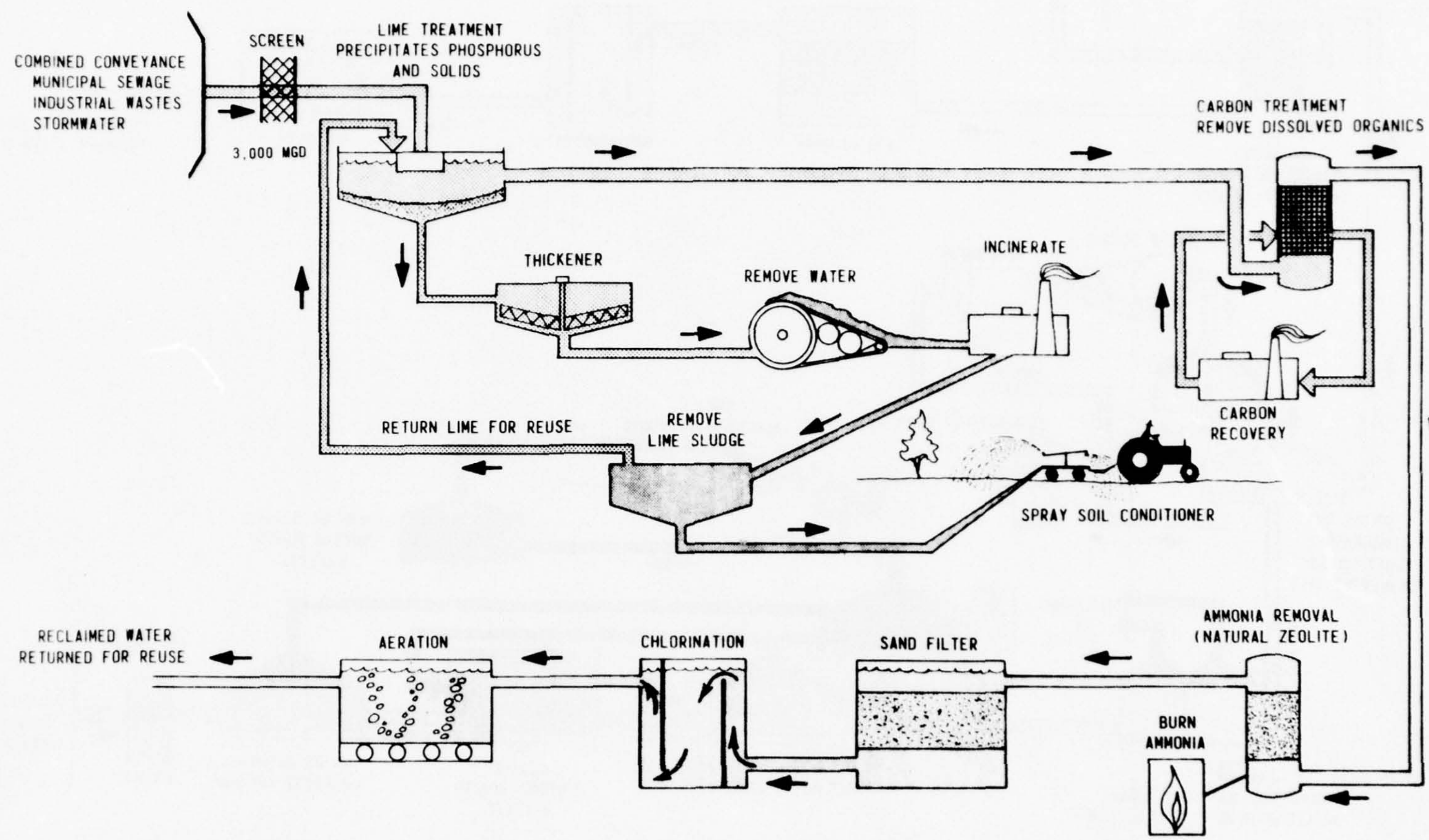
ATTACHMENT 6

ADVANCED · BIOLOGICAL TREATMENT - 1990 REQUIREMENTS



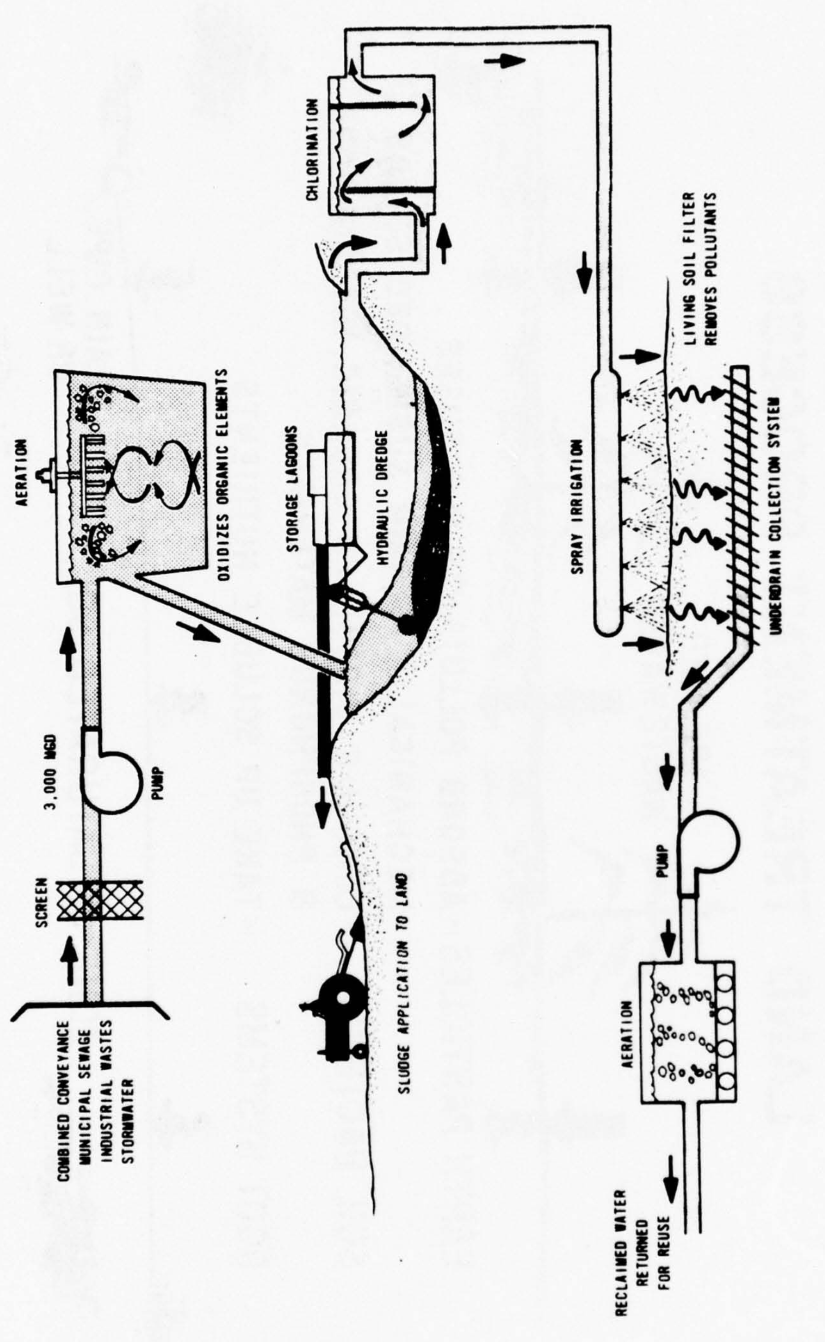
ATTACHMENT 7

ADVANCED PHYSICAL - CHEMICAL TREATMENT - 1990 REQUIREMENTS



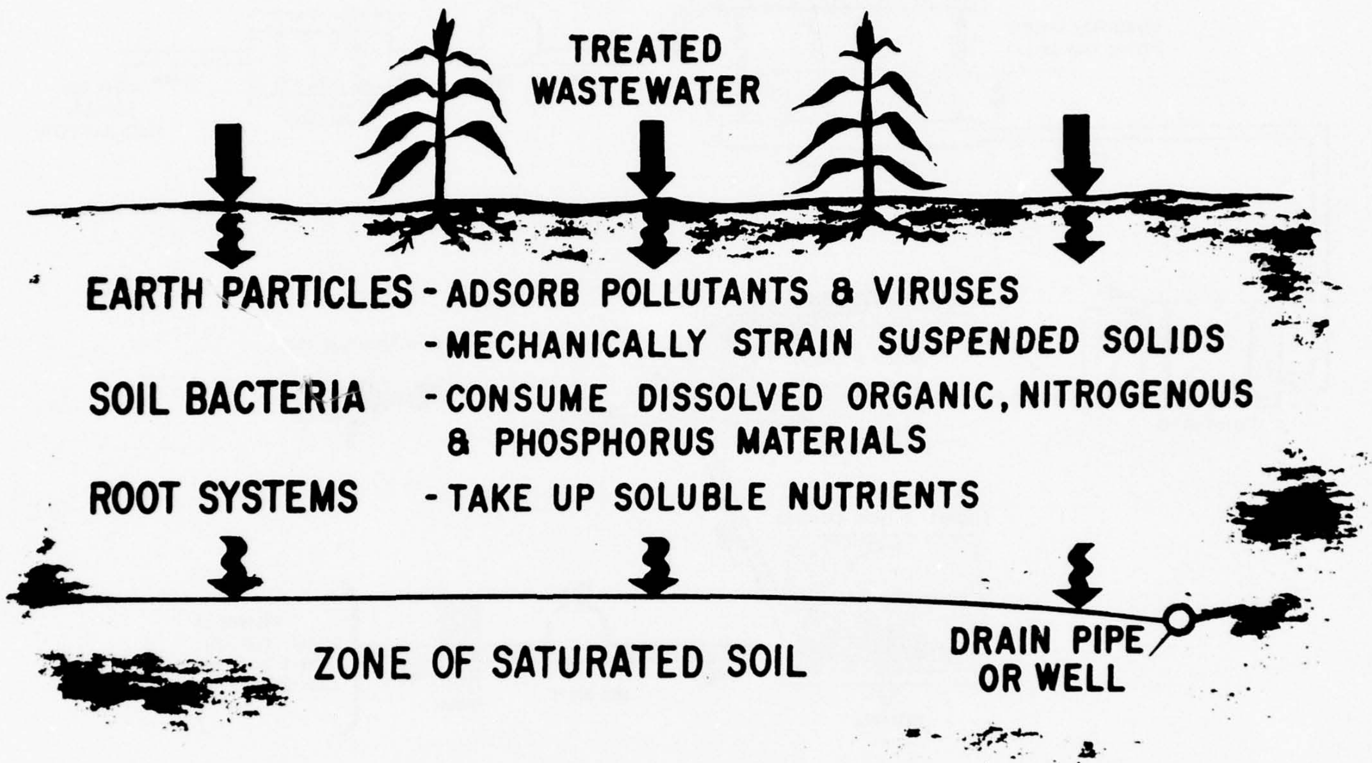
ATTACHMENT 8

LAND TREATMENT - 1990 REQUIREMENTS



ATTACHMENT 9

LAND TREATMENT PROCESS

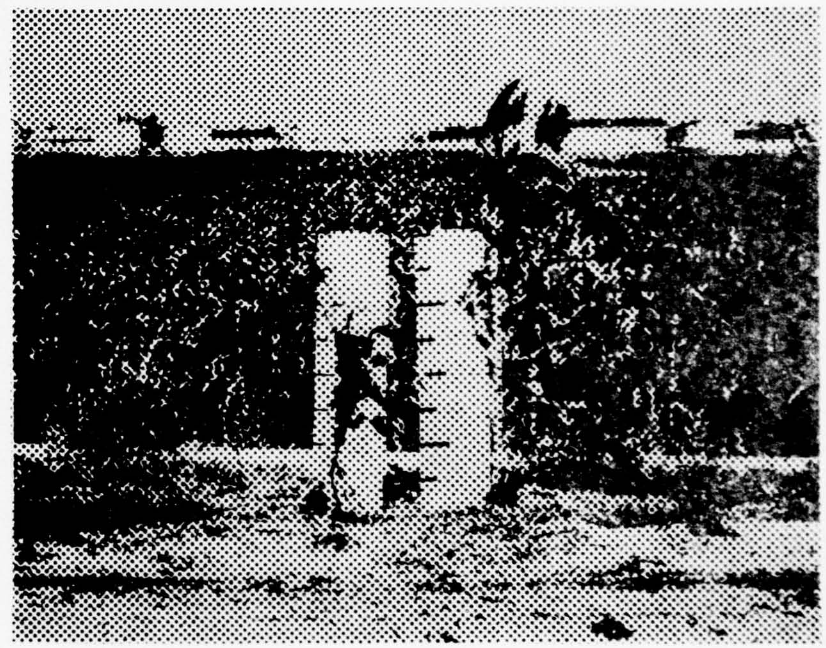


ATTACHMENT 10

SLUDGE MANAGEMENT OPTIONS

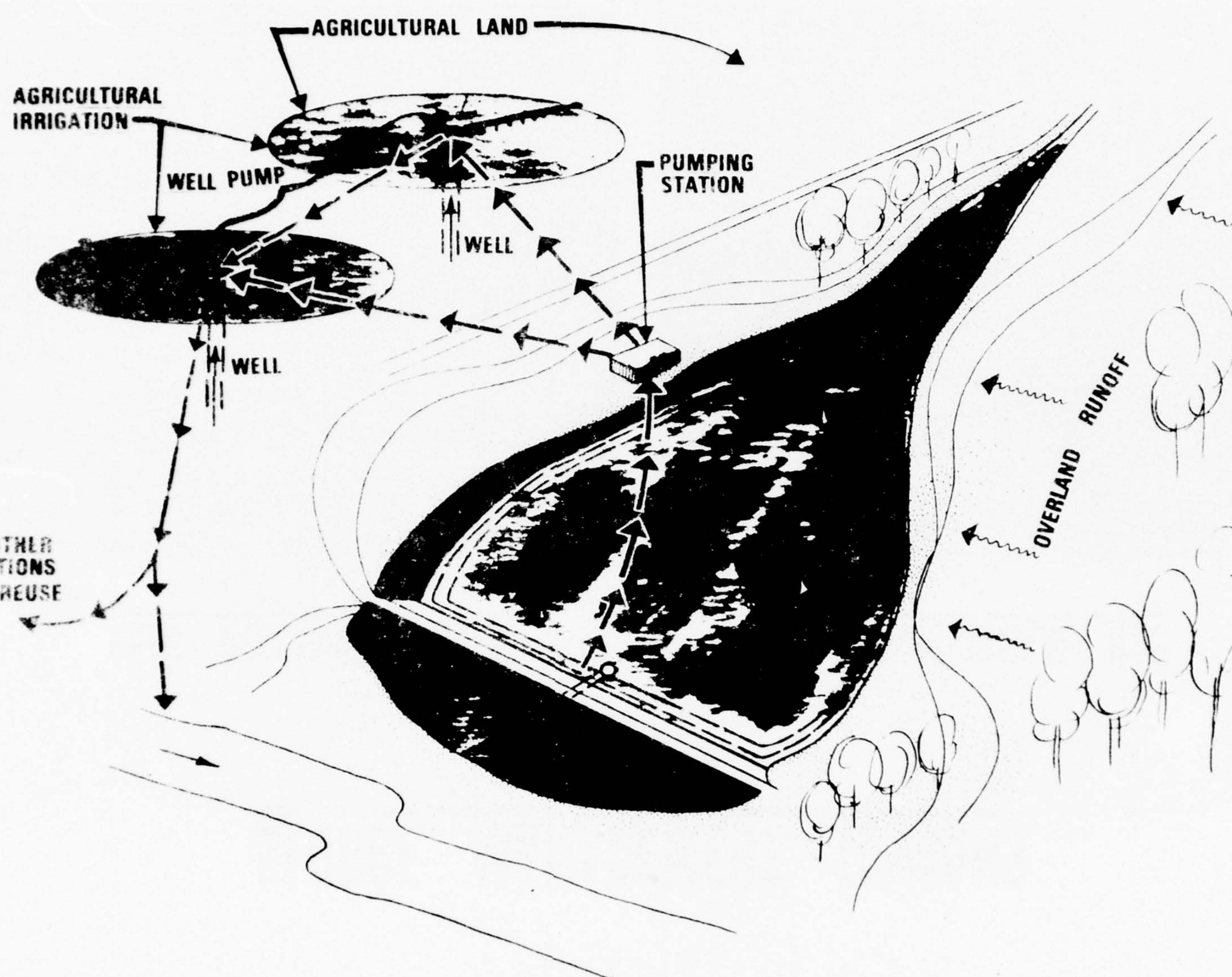
LAND RECLAMATION

AGRICULTURAL USE



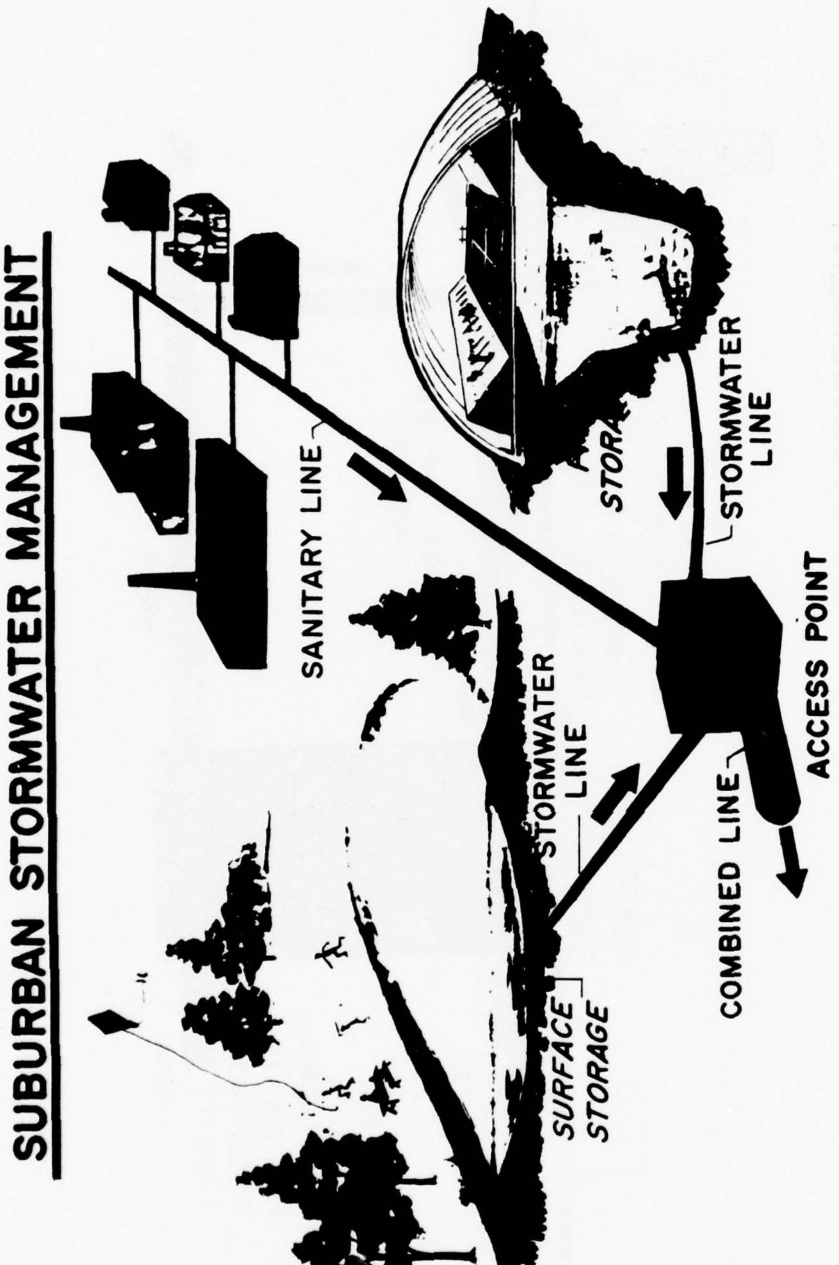
ATTACHMENT 11

TYPICAL RURAL STORMWATER MANAGEMENT



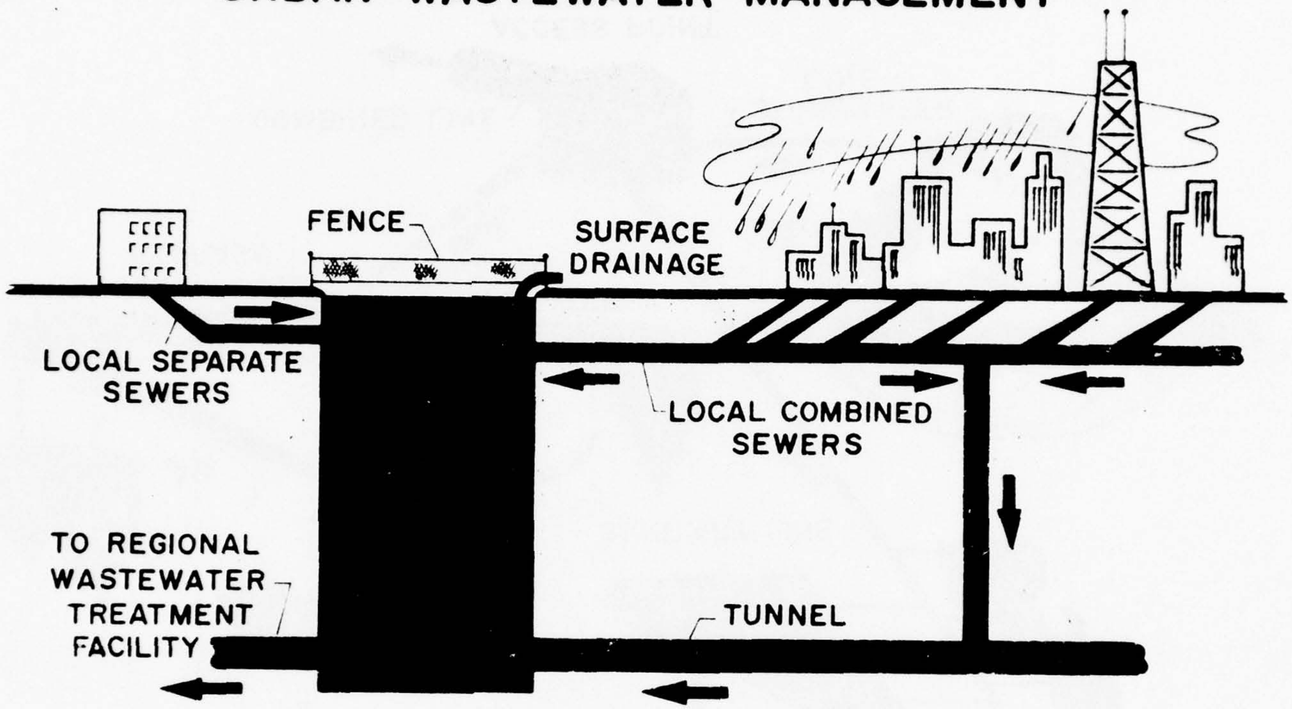
ATTACHMENT 12

MERRILL



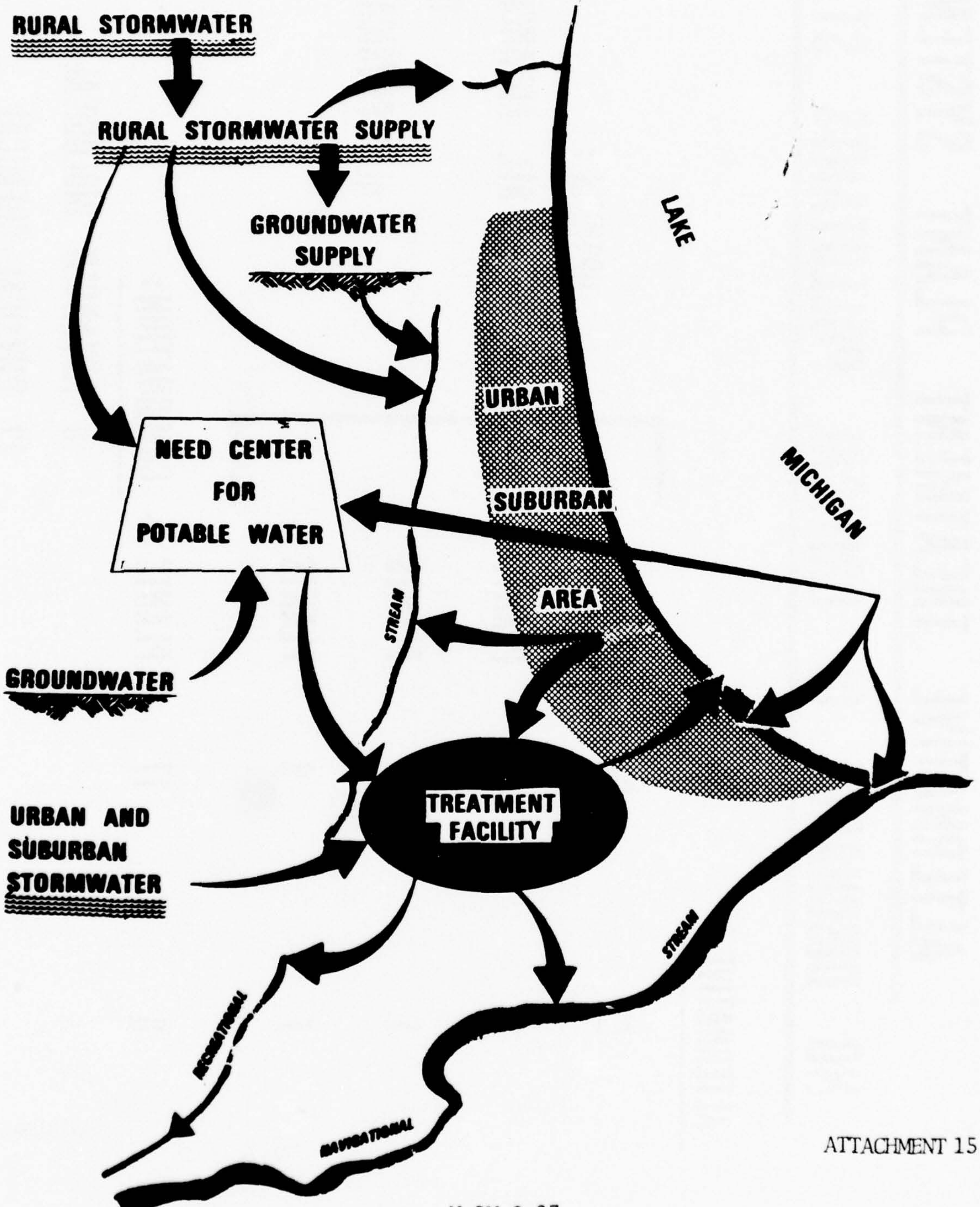
ATTACHMENT 13

URBAN WASTEWATER MANAGEMENT



ATTACHMENT 14

TYPICAL PROVISION FOR REUSE
WATER BALANCE FOR 1990 FLOWS



ATTACHMENT 15

ALTERNATIVE TREATMENT PLANT SYSTEMS

NO DISCHARGE OF CRITICAL POLLUTANTS STANDARD

ALTERNATIVE		
C	64	PLANTS
D	41	PLANTS
E	17	PLANTS
F	8	PLANTS
G	17	PLANTS - COMBINATION:

OPTIONS (C–F):

ALL ADVANCED BIOLOGICAL

OR

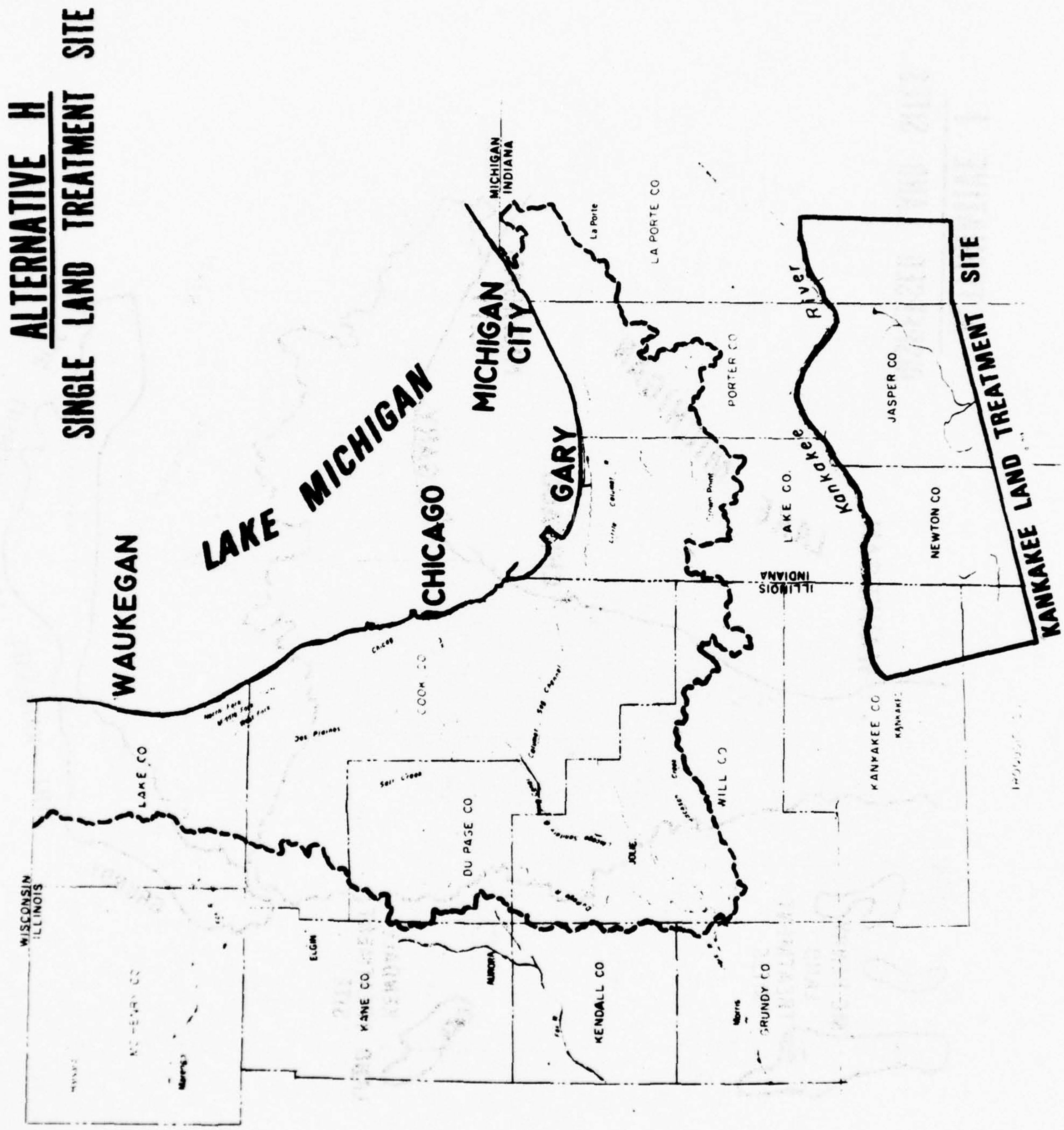
ALL PHYSICAL - CHEMICAL

COMBINATION (G):

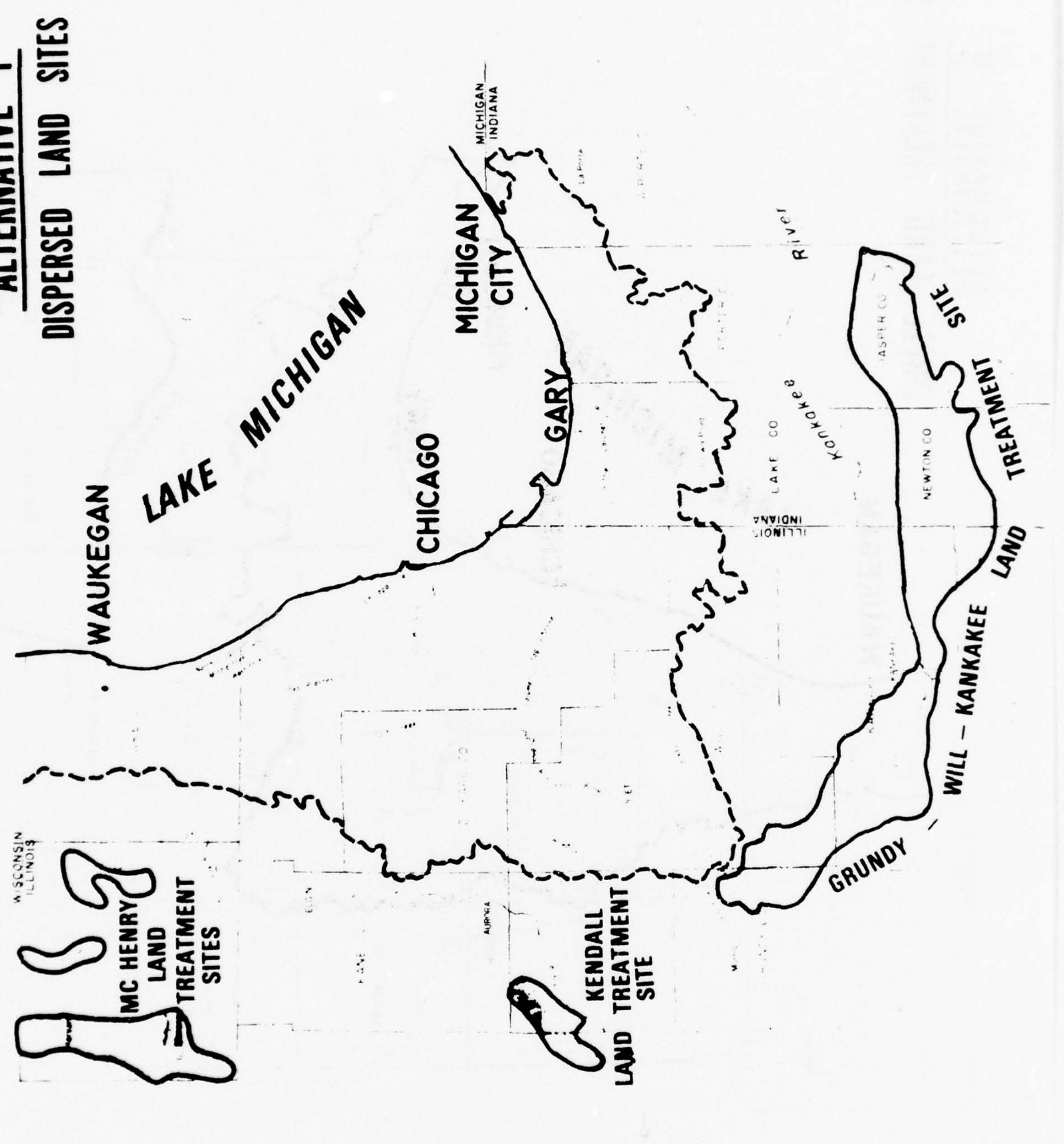
5 ADVANCED BIOLOGICAL

12 PHYSICAL - CHEMICAL

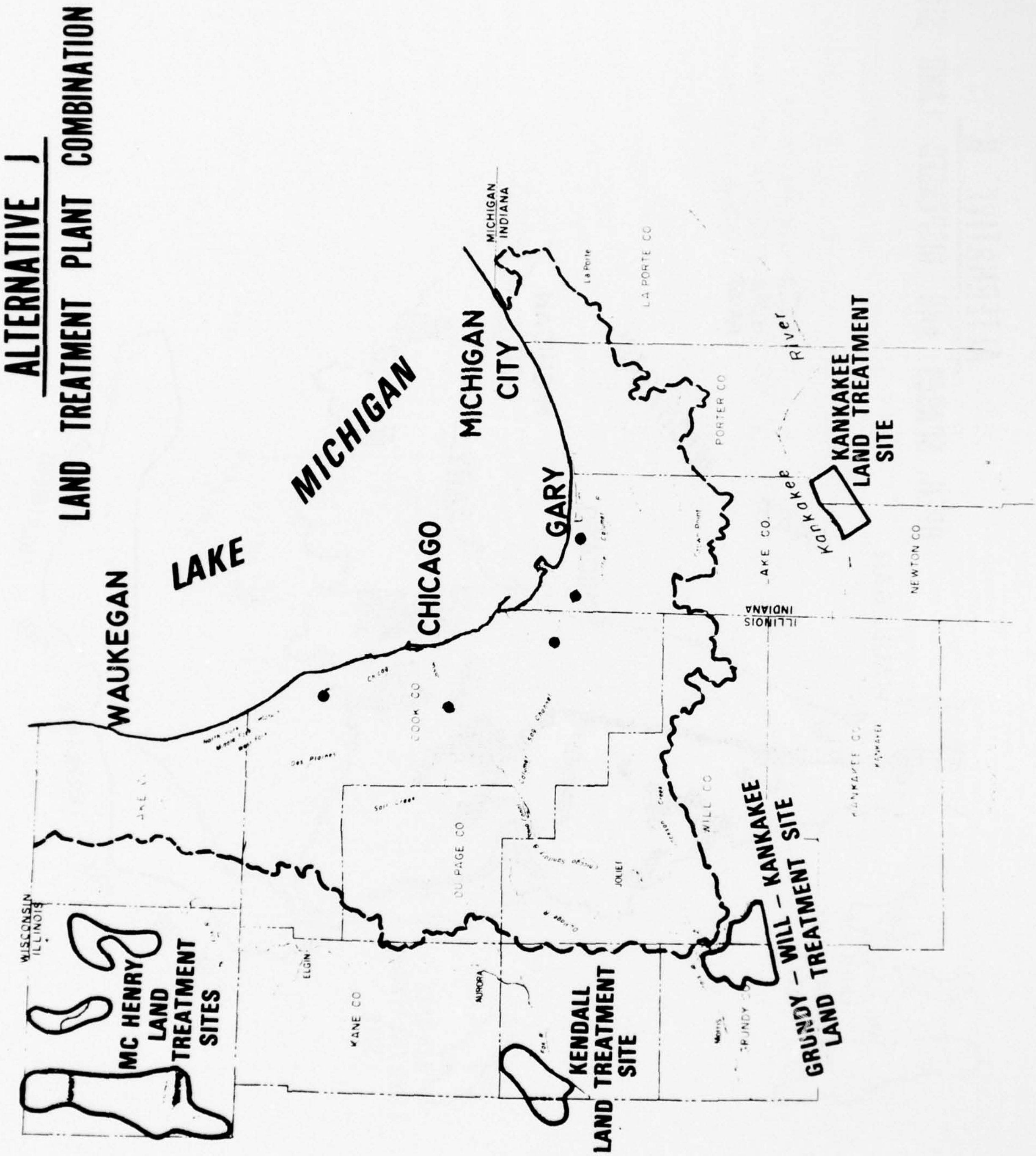
ATTACHMENT 16



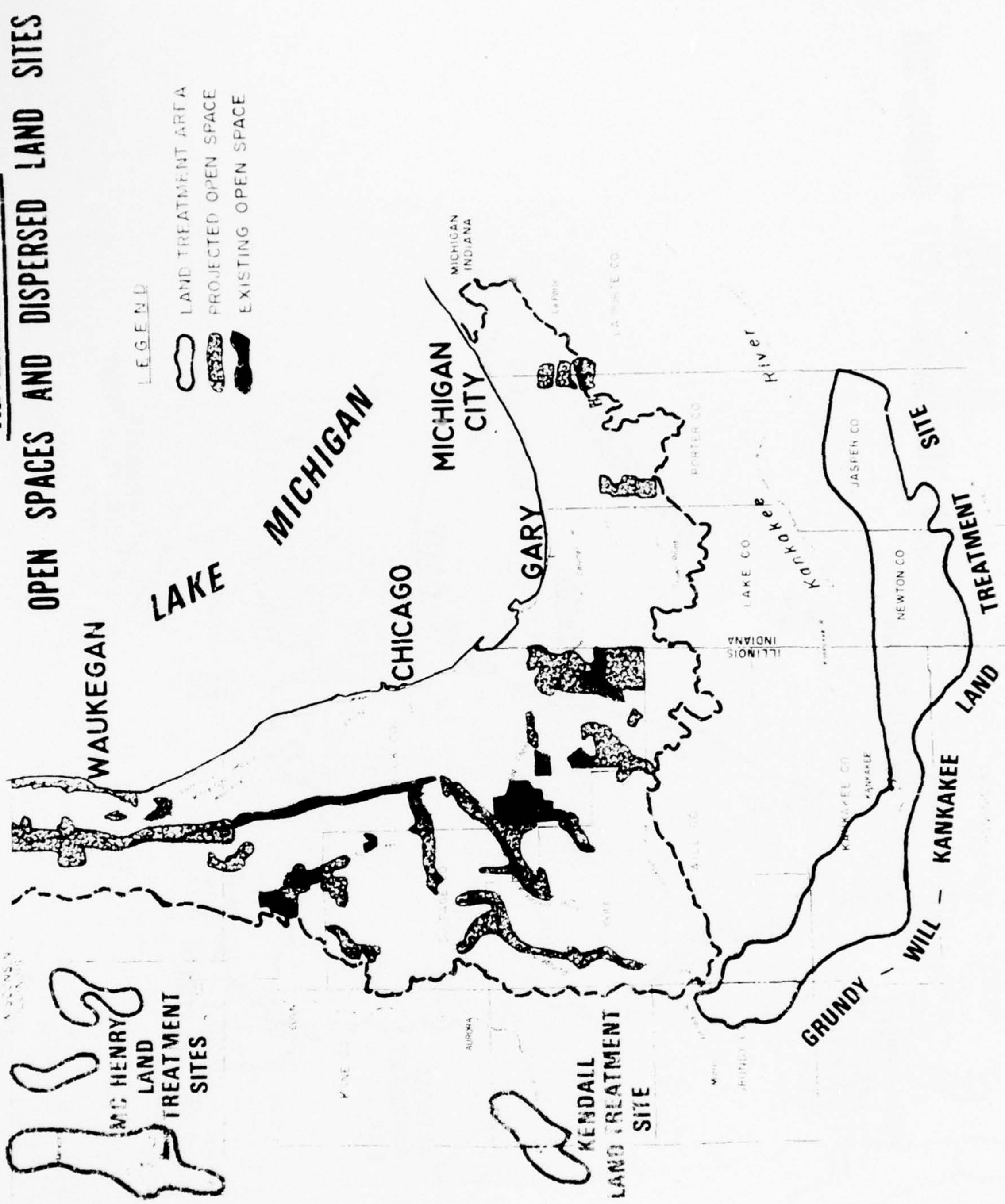
ATTACHMENT 17



ATTACHMENT 18

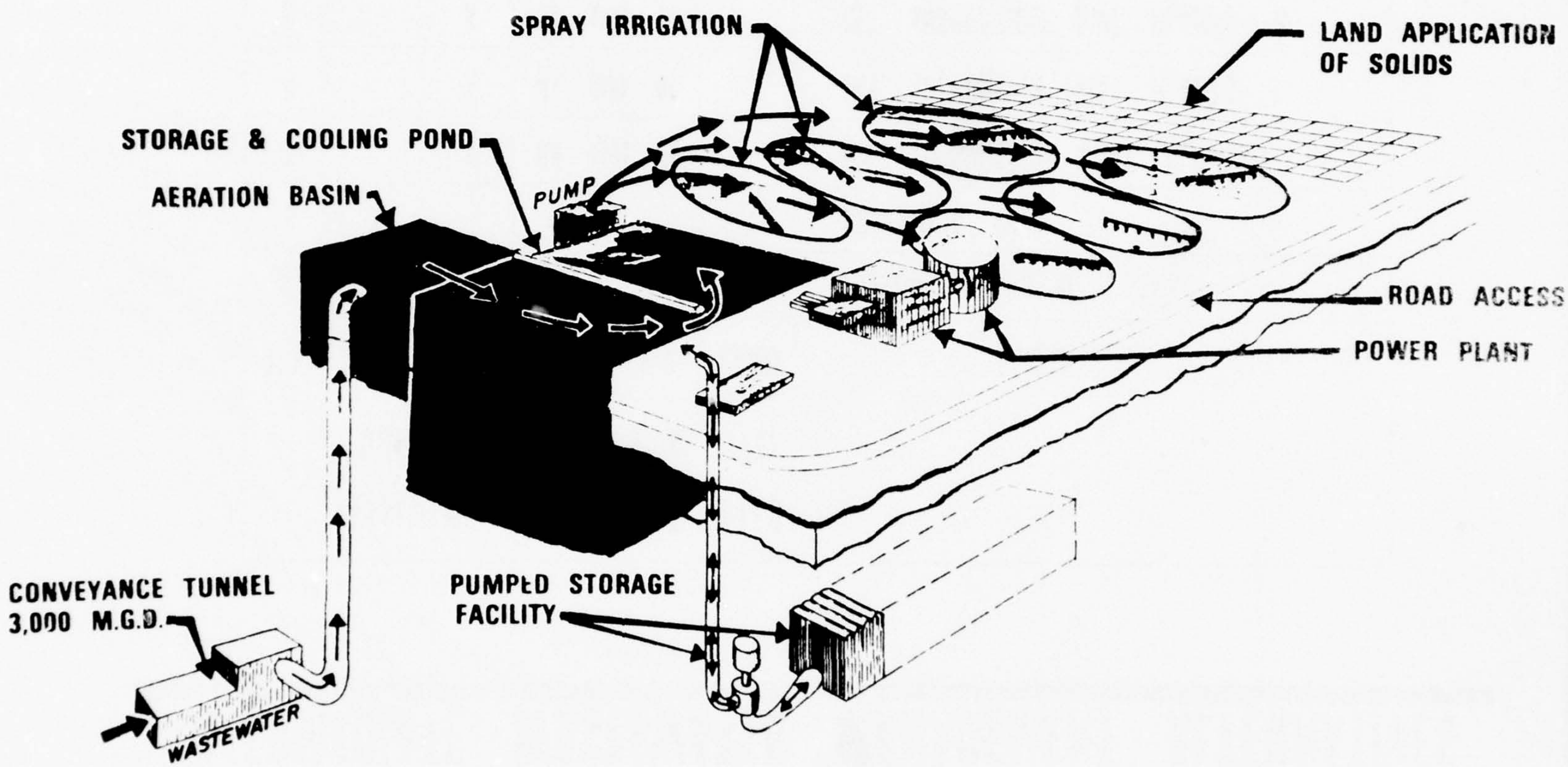


ATTACHMENT 19



ATTACHMENT 20

LAND TREATMENT - POWER PLANT COMBINATION



ATTACHMENT 21

INTERMEDIATE WASTEWATER MANAGEMENT ALTERNATIVES

ALT.	EFFLUENT QUALITY		TREATMENT SITES (NUMBER & TYPE)			REMARKS
	EXIST	NDCP	BIO	P-C	LAND	
A	X		64			EXISTING REGIONAL PLANS
B	X		41			SCREENING BASE
C		X	64 OR 64			MAX. DISPERSION AWT PLANTS
D		X	41 OR 41			INT. DISPERSION AWT PLANTS - I
E		X	17 OR 17			INT. DISPERSION AWT PLANTS - II
F		X	8 OR 8			MIN. DISPERSION AWT PLANTS
G		X	5 & 12			COMBINATION AWT PLANTS
H		X			1	SINGLE LAND SITE
I		X			6	DISPERSED LAND SITES
J		X	5		6	COMBINED LAND & AWT PLANTS
K		X			6	OPEN SPACE & LAND SITES

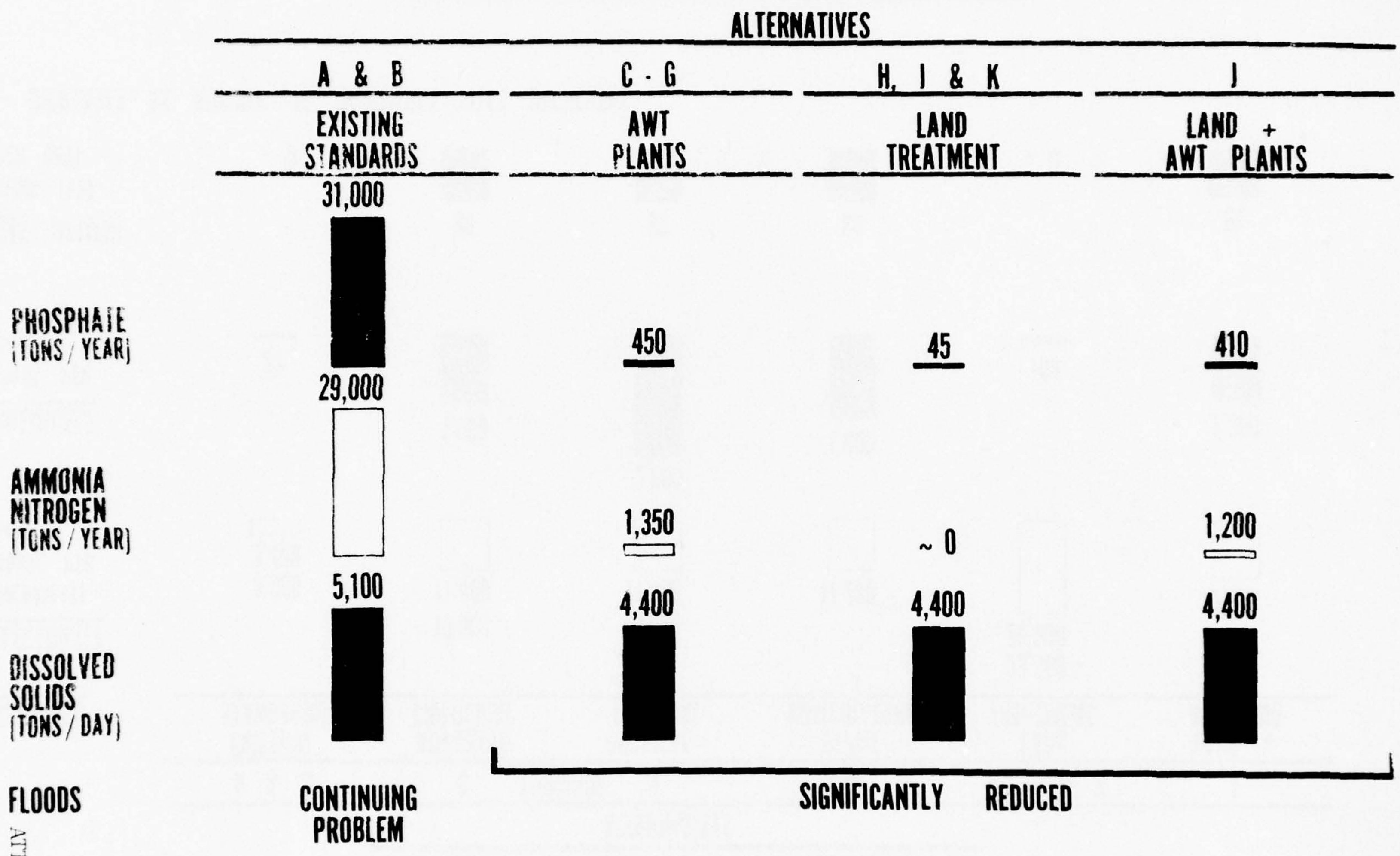
COMPARATIVE RESOURCE REQUIREMENTS

	ALTERNATIVES					
	A & B	C THROUGH	F	G	H, I & K	J
RESOURCE	EXISTING STANDARDS	ADVANCED BIOLOGICAL	PHYSICAL - CHEMICAL	PLANT COMBINATION	LAND TREATMENT	LAND + ADV. BIO.
ELECTRICITY (MEGAWATT - HOURS PER DAY) •	3,000 - 3,400	10,500 - 11,400	10,500 - 11,400	11,200	23,000 - 26,000	12,200
CHEMICALS (TONS PER DAY)	28	1,500	2,600	1,800	100	1,360
GAS (MILLION CUBIC FEET PER DAY)	~ 0	90	90	90	~ 0	81

• INCREASES AS NUMBER OF TREATMENT SITES DECREASES

ATTACHMENT 23

COMPARATIVE IMPACT ON WATERWAYS



ATTACHMENT 24

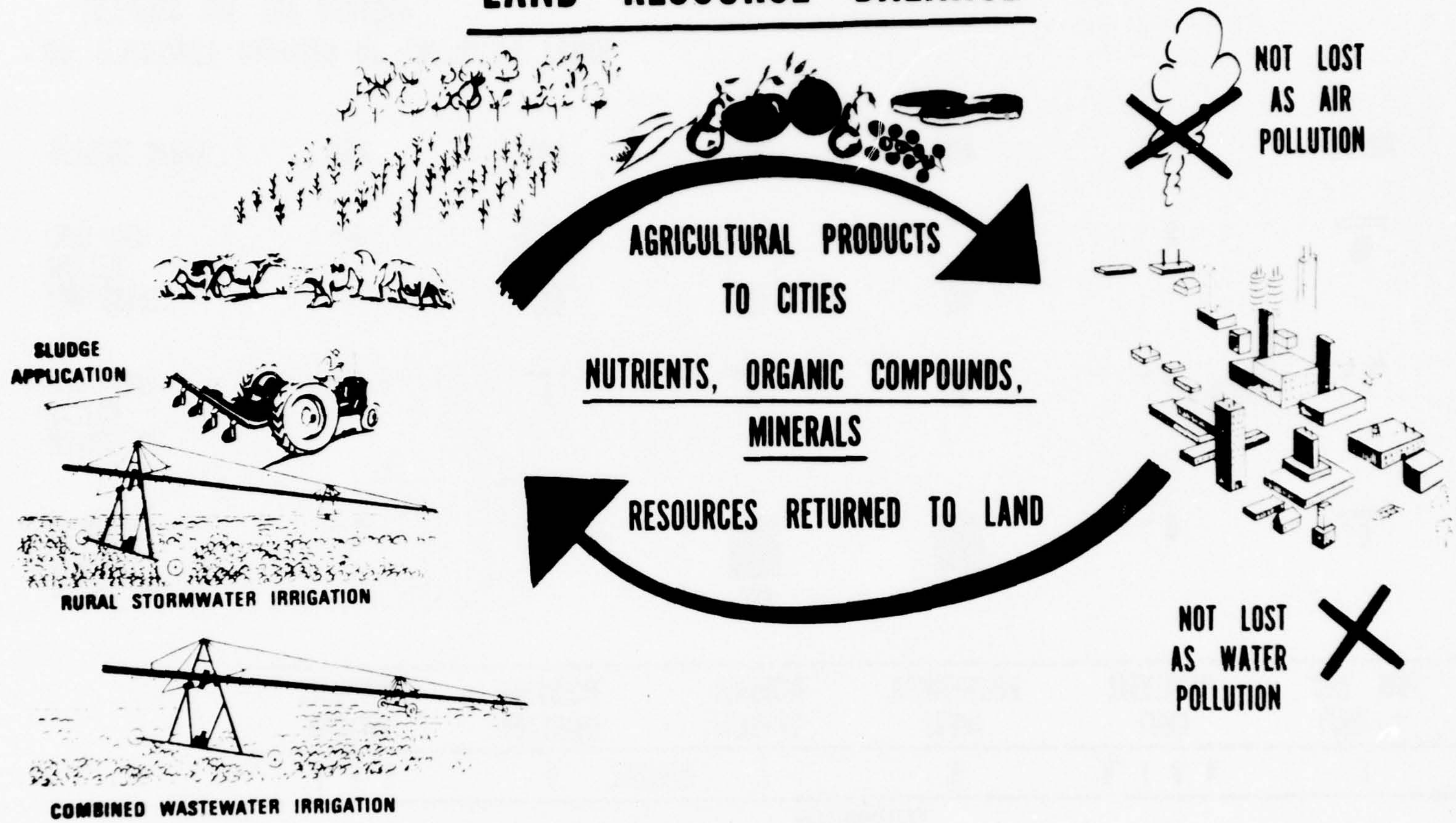
COMPARATIVE IMPACT ON THE AIR

	ALTERNATIVES					
	A & B	C THROUGH	F	G	H, I & K	J
	EXISTING STANDARDS	ADVANCED BIOLOGICAL	PHYSICAL-CHEMICAL	PLANT COMBINATION	LAND TREATMENT	LAND + ADV. BIO.
OXIDES OF NITROGEN (TONS/DAY) •	~0	25	250	200	~0	5
OXIDES OF SULFUR (TONS/DAY) •	~0	1	11	10	~0	>1
PARTICULATE MATTER (TONS/DAY) •	~0	225	225	225	~0	45
AEROSOL SPRAY	LOW	LOW	NONE	LOW	HIGH	MEDIUM

• AIR POLLUTANTS PRODUCED BY SUPPORTING POWER FACILITIES ARE NOT INCLUDED

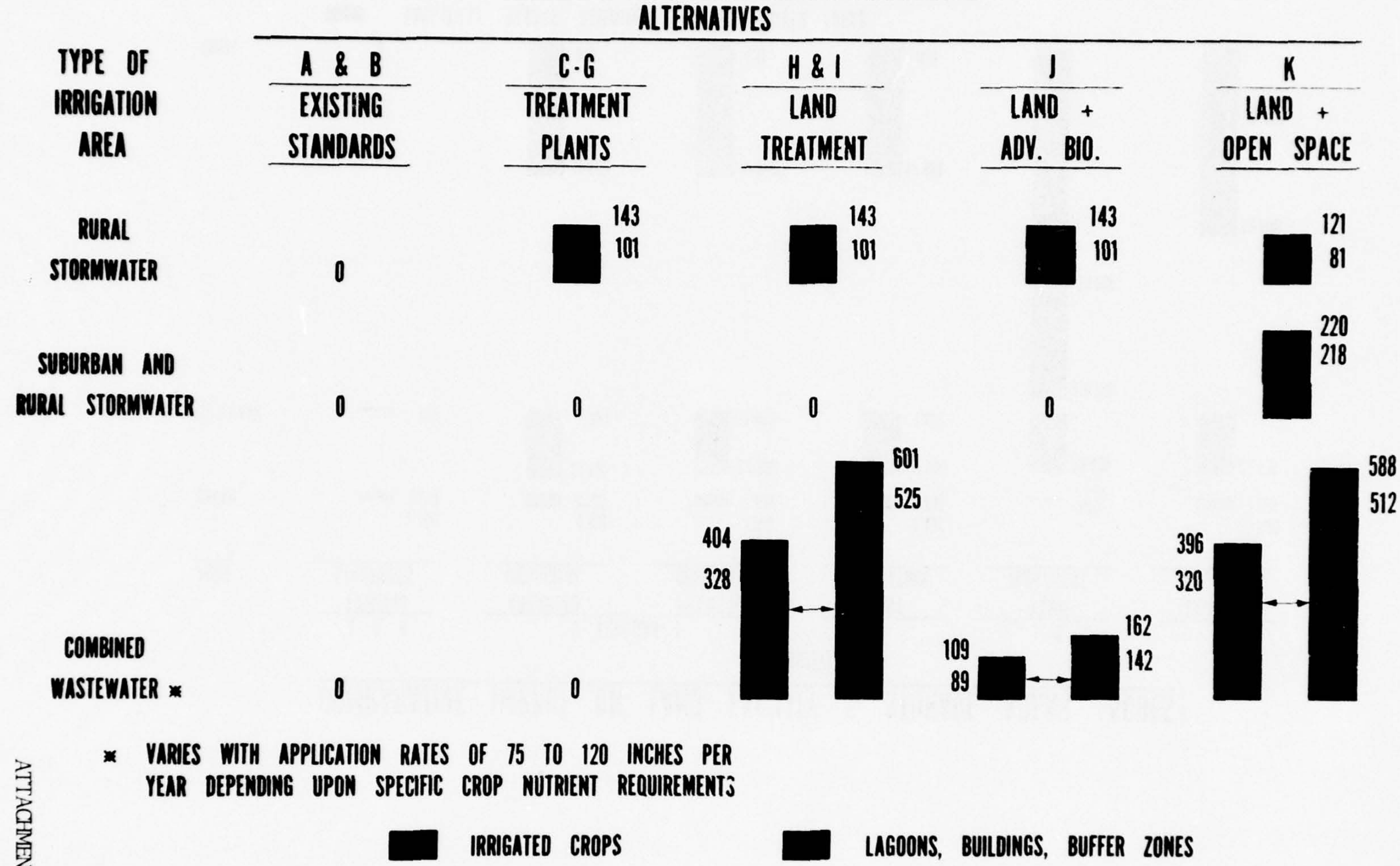
ATTACHMENT 25

LAND RESOURCE BALANCE



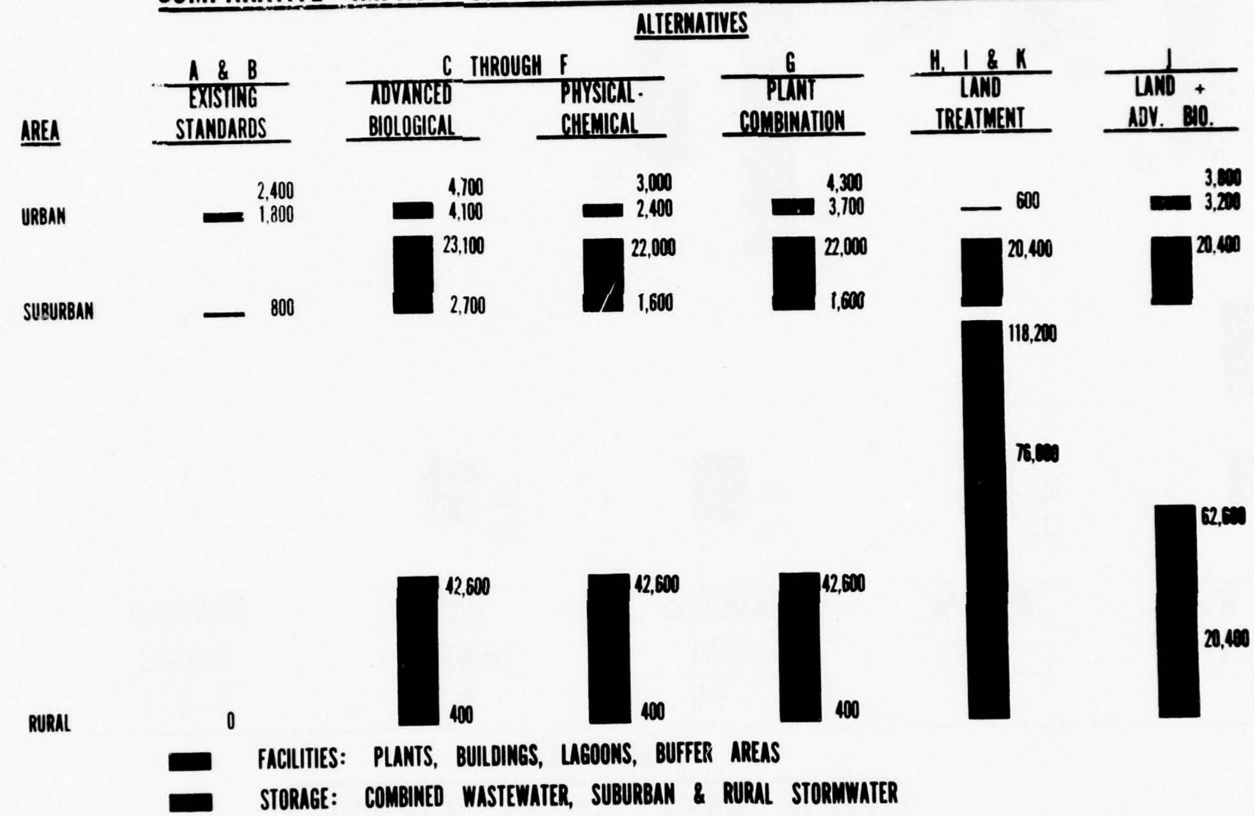
ATTACHMENT 26

COMPARATIVE IMPACT ON LAND IRRIGATION AREAS (1,000 ACRES)



ATTACHMENT 27

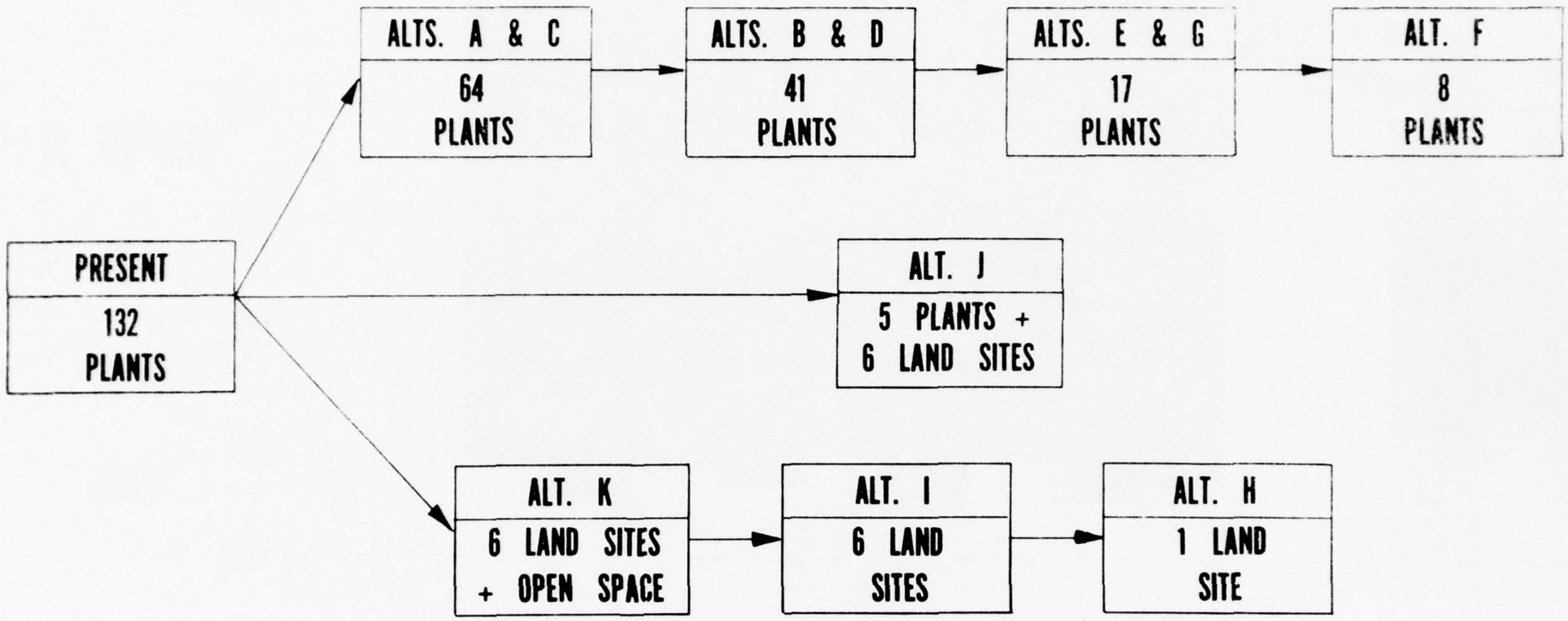
COMPARATIVE IMPACT ON LAND - FACILITY & STORAGE AREAS (ACRES)



ATTACHMENT 28

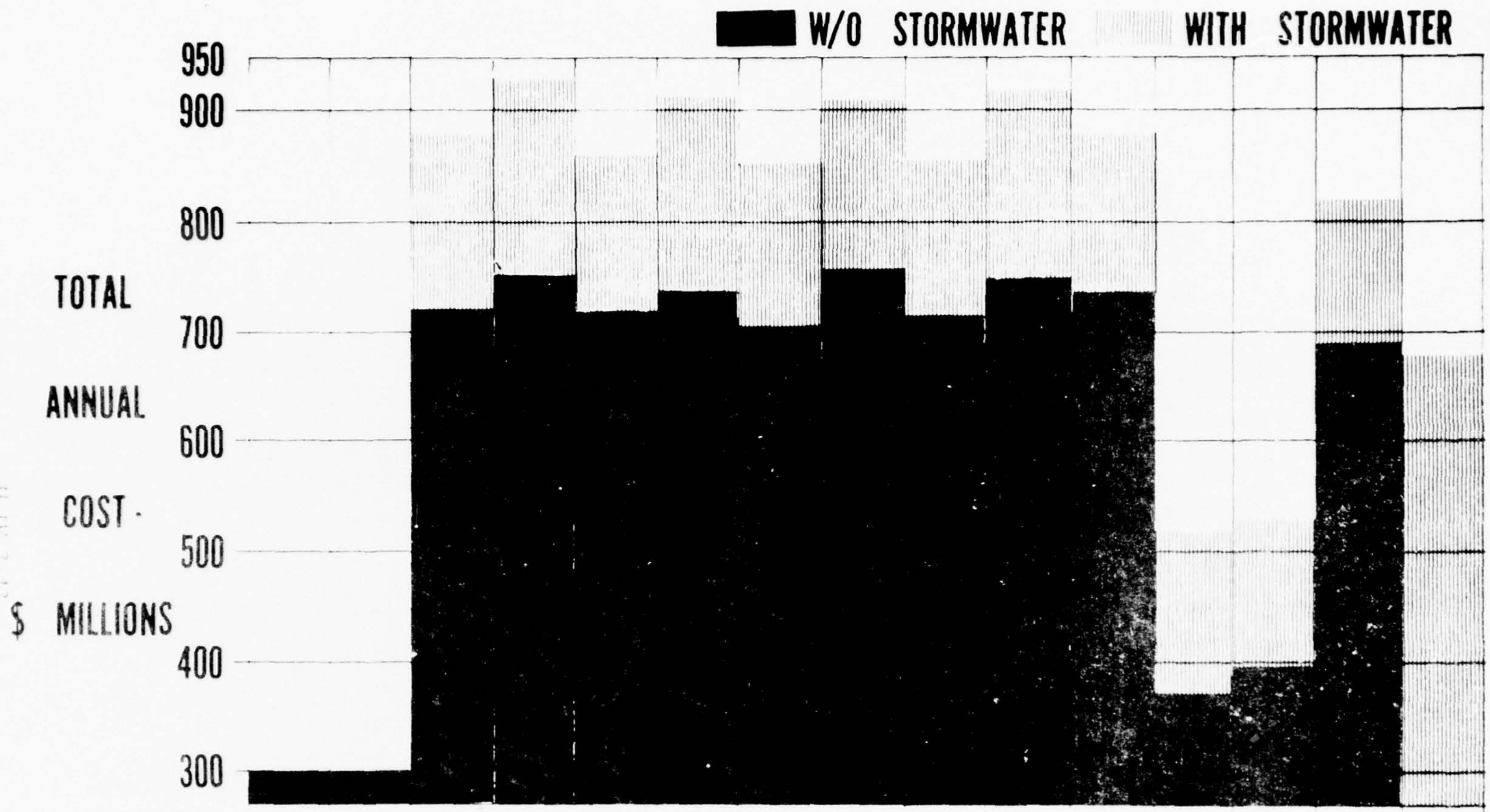
IMPACTS ON EXISTING INSTITUTIONS

IMPACTS INCREASE WITH INCREASED REGIONALIZATION



ATTACHMENT 29

TOTAL ANNUAL COSTS



ALTERNATIVE	A	B	C	C	D	D	E	E	F	F	G	H	I	J	K
NO. PLANTS	64	41	64	64	41	41	17	17	8	8	17	1	6	6	N/A
TECHNOLOGY	ST.	ST.	←					NDCP							→
	STD	STD	PC	AB	PC	AB	PC	AB	PC	AB	AB + PC	LND	LND	AB + LND	LND + REC

PART 2 - SECTION II

INDIANA PUBLIC MEETING, 14 SEPTEMBER 1972

Following the District Engineers' briefing, the meeting was opened to receive written and verbal statements. Pertinent statements have been summarized below to reflect the tone of the meeting and to indicate the attitudes and concerns of those in attendance. The statements made were overwhelmingly opposed to the land treatment system. The audience response supported the statements of opposition. The few speakers who indicated support or a willingness to assist efforts of the study did not receive support from the audience. In general, the tone was sceptical of the intent and goals of the study, and one of "banding together" against outside land (unwanted) interference. Most evident was a resentment towards using the rural area to solve a wastewater problem generated in the Chicago Metropolitan Area. The statements that were received after the public meeting for inclusion in the final report further underscored this opposition. Duplication of the same comments has been avoided, when possible, in order to better underscore the range of viewpoints presented.

SUMMARY OF STATEMENTS

It seems fantastic that five hundred square miles of Indiana farmland, almost two counties, would be required for treatment of wastewater. Because of this and the lack of knowledge and field experience, we oppose this project. The metal that's going to be pumped down and sprayed over these lands might make this land sterile. No one has answered that question. What effect is it going to have on our sub-water? How many wells is it going to poison? We're concerned about some of the recreation sites we have in the vicinity--Willow Slough, LaSalle Fish and Game, Pulaski, and several others we have. What will be the effect of 75 to 100 inches of additional water fed over that area, which already has a high water table now? What's this going to do to the community? There is a pilot plant that will go into effect at Muskegon, Michigan. It would be much better if we had experience from that plant. Further, I hated to see all the land proposed to be taken out of the State of Indiana. A greater portion should be from Illinois.

I speak at this time in opposition to the Chicago South End of Lake Michigan Waste Management Progress Report No. 3, as it concerns the area of Indiana south of the Kankakee River. These areas in proposal #3

are lettered as H, I, J and K. . . The living filter has not as of yet proven operational. We believe the estimated cost of the land and of homes was priced far too low and no mention was made of compensation for business property, or the cost of relocation of businesses and the loss of revenue to industry and to small business. It is totally inequitable to expect any person or group of persons to prepare arguments in opposition in the short period of time that we have had to date. We are greatly concerned about our environment and also wish to find solutions. The answer is not to remove from production many acres of the most highly productive farm land in Indiana.
We are totally opposed to this project and will use whatever legal means that are necessary to prevent this from becoming a reality in our area. To this end then I request that you keep an open mind as you hear the testimony of the opposition and in closing I wish to impress upon you that we are vitally concerned about the future of our area.

The Indiana Department of Natural Resources is aware of the objectives of the C-SELM study, and of the fact that all reasonable alternative solutions should be examined. However, on the basis of available information, we must register a strong reservation concerning the feasibility of a land disposal system. The basis for this is that the capability of the land to treat wastewater over a long period of time without serious impairment or destruction of the land for beneficial uses, including wastewater disposal, has not been adequately demonstrated. The fact is that the plan would require enormous quantities of land in the State which has only a very limited supply in terms of its industrial, agricultural and population needs. To date, we have seen no analysis of the impact of this scheme on the State with respect to the lands necessary for the project. Additionally, the study has not reported on the extensive and serious problems of legal, jurisdictional and institutional matters involved.

I can see no benefits for Northwestern Indiana from this plan. Plans H, I, J and K would take away five hundred and fifty thousand acres of our land, land that many of us have had for generations. The plans would take away the Towns of Demotte, Wheatfield, San Pierre and Lake Village. We just can't allow this to happen. I have several very serious objections: Number one is that the manner in which this study was undertaken. I did not hear of the first public meeting. I didn't hear about this meeting until two weeks ago in the Hammond Times. There is a large booklet on the study that has all the alternative plans. It had the cost breakdown and I was just shocked to see these costs: $20,000 a house, $5,000 for relocation and $525.00 an acre for

our land. Can we buy any farm land for $525? We don't need any benefits for our farm ground. We have productive farm lands. We are breaking all the records in the State with the amount of corn and soybeans we are raising. We don't need sludge. This plan cannot be implemented unless it is proved to be a benefit to us. The preamble to this study stated that it would have to show feasibility and help us environmentally, economically and socially. From an environmental standpoint, nuclear power plants are the worse contamination you can have, and it certainly isn't going to help our environment. It will also destroy all our recreational land areas. It's going to be a disaster for us economically and socially. Where in the world are we going to put 25 thousand people? The figures you have presented to us as to a number of people that are going to be displaced is very incorrect. As a developer myself, we can show to you that from ten to twenty new families per week are now moving into this area. The homes are not $20,000 homes, but $35,000 to $50,000 homes. Lastly, I am not an expert or an engineer, but after reading the very thick booklet on this program, I have very serious reservations as to whether we have the technology today to implement this particular project. Like the other speakers said before, we have to wait and see. Pennsylvania State now has a similar project and has been working on it, and the engineers there have a great number of their facts on their particular work. However, it concerns only human waste. It does not concern stormwater, industrial pollutants, or heavy metals. All three of those things would be taken care of by any of these C-SELM alternatives. They are waiting for Muskegon, Michigan plants to be completed so that they can give us some data. However, that's for a small area of Muskegon Heights, not 7.2 million people of Chicago. This plant may just not work for our particular area. I've asked several people about what will be done about the salt that's going to come into the water when they salt the streets in Chicago, and I haven't had any explanation. All you farmers know what salt does for the land. It just doesn't let anything grow.

I don't see why we have to spoil a virgin area that has fresh air and clear water in order to improve the quality of the water in the South Lake Michigan area. I believe that we have the brains and the know how to solve the problem of the South Lake Michigan area in the South Lake Michigan area. Therefore, I oppose your plans H, I, J and K.

Indiana, and Jasper County as a whole, is the best area available in which to live. We should not be forced to sacrifice this area to solve a problem in which we had no part in creating, especially since 80 percent of this problem is created across the state line. This area contains some of the most valuable farmland in the State, and

possibly the nation. It is needed for future food needs. It is also needed for major homesites to allow for the expansion of the industrial portion of Lake and Porter Counties, Indiana. Therefore, we oppose any plan that would create a sewage treatment plant anywhere in the Kankankee Valley area.

The report under consideration can only be classified as a progress report and not as a blue print for action. "Water, Our Many Splendored Inheritance, How Can We Most Enjoy It" is a smoothly written, attractive brochure that leaves far too many of the very important social, economic and scientific questions unanswered, especially when the so-called living filter system is discussed in depth. The brochure is very helpful in understanding wastewater collection, treatment and reuse methods and problems. The Corps is also to be commended for inclusion and proposals for the collection, storage and treating of storm water running off the suburbs and surrounding countryside. Farmers have expressed concern for the problems entailed in with the proper and efficient treatment and safe disposal of the increasing volume of municipal and industrial waste in the C-SELM area. We hope that reasonable plans can be formulated and filters constructed so that the water quality can be improved and reuse of water assured. However, we find that the proposed living filter system leaves far too many questions unanswered for it to be acceptable to farmers and other residents of the area in the disposal irrigation sites. We have reviewed the geology of the proposed wastewater disposal area and our consultants survey reports for Newton and Pulaski Counties. Here are some of the unanswered operational, legal and jurisditional questions concerning the proposed living filter system. (a) Will the system operate satisfactory over a long period of time? The Muskegon system is yet untried. (b) Under what legal and jurisdictional framework would the system operate? Would the state and county planning groups of Indiana have anything to say? (c) What are the benefits accruing from the system in dollars? Only broad estimates of cost are presented here. Even if 600,000 acres of land are removed from agricultural production, with an estimated 80 percent tillable and if $90 per acre per year is used, then $43,200,000 of annual gross value of agricultural production would be lost. A depressed area would also be created by the loss of approximately $60 million in net assessed valuation for tax purposes, assuming $100 per acre net assessed. This would increase the burden on the remaining taxable property in the area.

Some agricultural questions are: (a) What will be the effect of 60 to 100 inches of water--the amount of rainfall plus the irrigation effluent--applied annually to the soil. Will the cattle and sheep that

consume the canary grass have a problem? (b) What will the spray irrigation do to the quality of the underground waters in the area adjacent to the project area? More must be known concerning the effects of the toxicants and pathogens placed on soils receiving wastewater irrigation and percolating into the underground water. The groundwater on the disposal area is only two to ten feet below the surface generally. (c) How long can soils in the disposal area continue to receive copper, zinc, lead and cadmium without becoming unproductive? Will phosphorus cease to be filtered out by the soil after a few years, and thus make the disposal area ineffective for phosphorus removal?

Social questions and impacts unanswered by the living filter system are: (a) How can untreated industrial and muncipal waste coming into the receiving lagoons avoid polluting the air with unbearable odors? (b) If farmers and others owning the majority of the over 700 square mile treatment and disposal area chose not to stay in the area because of the great uncertainty of being unable to raise crops at a profit or for other reasons decide they must sell, where would they relocate in agriculture and related businesses?

In summary, elected public officials and government employees, members of non-farm organizations and all citizens must understand that the inter-relationships of a productive agriculture involve matters relating to the environment. We have carefully reviewed the proposed living filter system and find it unacceptable to farmers and farm bureau families in any area in Indiana. We urge that the Corps continue their investigations into the physical, chemical and the biological concepts to find an acceptable solution to C-SELM wastewater treatment and disposal problem.

Plans H, I, J and K would be a disaster to our area. As a graduate of Purdue University School of Agriculture with 18 years of practical farming experience, I'm convinced that the so-called living filter would become, in the long term, a dead filter, or at best a toxic filter. Our area at present is thriving in commerce, construction and agriculture. According to the Wall Street Journal recently, it is one of the fastest growing areas in the nation. Our communities are also rich in spiritual and intangible values; thus we are not about to let you lay desolate these areas. We urge you to use the technology available to save your cities and our lakes and streams, for we realize the need, but without destroying the nation's valuable resources.

The teachers of the Kankakee Valley School Corporation are opposed to such a plan as it would seriously disrupt the educational well-being of the students living in the area. Uprooting an excellent educational system, and forcing the young boys and girls which it serves to relocate, would in our professional opinion, cause serious hardships to the students and jeopardize their constitutional right to a quality education.

The plan for distributing and applying Chicago wastewater to northern Jasper County is not in the best interest to its people and the community. Thousands of acres of valuable crop land would be in jeopardy of total ruin. The people making a living on these rural farms would be forced to seek other employment. The District also questions the applications of sludge on the sandy soil of northwestern Indiana. These soils provide a poor agent for purifying wastewater. The Indiana State Board of Health will not even approve sanitary landfill in sites of these sandy soils because of the serious threat of contamination to the nearby wells.

The Corps of Engineers is moving in the right direction although obviously there are many important areas requiring further study and research and testing. As demonstrated here tonight, the public is deeply involved and does have the opportunity to bring forth their ideas, their judgements and their feelings.

SUMMARY OF QUESTIONS AND ANSWERS

At the conclusion of the statement period, the meeting was held open for questions. A summary of the ensuing questions and answers are presented herein.

Q. Have you taken any soil samples at the living filter sites to see if the area is suitable?

A. Approximately 50 soil samples were taken in areas of Indiana and Illinois. The samples showed capabilities of sustaining the soil filter.

Q. Where were these samples obtained?

A. Jasper, Newton, and Starke Counties in Indiana and in comparable adjoining counties along the Kankakee River in Illinois; in McHenry County, Illinois and in the vicinity of Will County, Illinois.

Q. Are the exact locations on record?

A. Yes, those samples and the parameters that were chemically analyzed are recorded in the Phase I report of this study.

Q. Who has the final responsibility for making the decision on which alternative to implement? Is it with the Government, the Corps of Engineers, or a vote of the people?

A. The responsibility for wastewater management rests with the State and local governments. These governments in turn have to be responsive to the desires of the people within their area. The Federal Government does not dictate which system to use. It's up to your state and local representatives to decide what kind of a system they're going to want in their area.

Q. In otherwords, the decision will be a concensus of the affected communities?

A. The decision making will be the same sort of process that is going on currently and has been done for hundreds of years in your area.

Q. Could you briefly elaborate on population relocation in Plan H, and could you clarify just what you have in mind for the areas around the holding lagoons?

A. It may be possible not to have any relocations at all. The actual area occupied by buffer zones and lagoons, etc. was 76,000 acres. Of course, you would not live in this area. In any area where this type of scheme is adopted, the least productive land, perhaps on a hillside or dune for example would be taken for this purpose. The best land would be kept for the agricultural purpose. The people that are located where a facility must be constructed would be relocated. But, hopefully, any scheme in order to be acceptable must not have a serious negative social impact. We recognize that you cannot move around large groups of people even though you give them comparable farms elsewhere. Obviously, such a move will destroy traditions and the social structure. Thus, regardless of which alternatives emerge from our final screening, we will want to talk to the public to ascertain the best area to implement such a system.

Q. It states in the brochure that 25,000 people will be relocated. Are you saying that this is not correct?

A. That number identifies the number of people to be relocated that live in the area where Plan H would be implemented. It's rather simplistic

until you actually begin to implement such a plan, talk with the people, and see what they would or would not want. What we are talking about is the number of people that are in the area where the sites would be constructed.

Q. On what basis did you get these figures?

A. The projections in population were based on figures from planning agencies and rural planning agencies. We will have to look very carefully at the figures if they are incorrect due to very recent trends. We will appreciate the help of local people in taking a closer look at those population numbers.

Q. Has a sociological study been made on these particular plans that we can review?

A. We have done some initial work with a socio-environmental evaluation team composed of representatives of universities in Indiana and Illinois. In the next phase of the study, when we've eliminated the least promising alternatives, we will concentrate efforts on the remaining five alternatives. We get into the kind of detail that you're talking about in this next phase of the study. That detail, of course, could reveal that some plan that looked pretty good is not.

Q. If I live in an area and had to be relocated, would I be reimbursed the full value of my property?

A. When the Federal Government is involved in any type of a relocation, the relocated individuals must be provided a choice of property which is at least equal to that from which they are being relocated. Federal legislation states that families should live in a certain standard of housing. If you live in a house above this standard, then this doesn't affect you because you will get a house of equal value. However, if you live in a substandard house, then you would probably get a better house. The desire and policy of the national government is to encourage residents in the rural areas to remain on their farms. Certainly the last thing that any study would want would be to accelerate the migration of people out of the healthful farm atmosphere into the city.

Q. How will the salt be taken care of?

A. In the table that was distributed there are figures concerning dissolved solids that refers to various salts. The land passes the salts through in the same way as the other advanced systems do. There is no change from the treatment efficiency of current plants in this aspect,

because this salt passes right on through and it's still in the effluent that is discharged at the other end of the system. In the land system you would have a leaching action which would not allow the build up of salts within the soil.

Q. What will happen to our water supplies if this system is instituted? Will they be contaminated because of the soil?

A. All these systems include a very elaborate monitoring system to assess on a continuing basis if there is any change in ground water quality. This type of system is operating in many parts of the country now. We expect no pollutants to get through the systems. If they did, the system would be shut down immediately until this situation was rectified.

Q. The water table in the Kankakee Valley is quite high, especially this time of the year. Is the efficiency of the land system affected by the water table at all?

A. The site that's now being built in Muskegon County is in an area where the water table is right at the surface. It is almost a marsh. This is handled by a one time pump-down to provide five to six feet of non-saturated soil above the water table. Then you just maintain the new water table through the underdrain and pumping system. At the edge of the area, of course, the water table slopes back up to its original level outside the zone of influence.

PART 2 - SECTION III

ILLINOIS PUBLIC MEETING, 18 SEPTEMBER 1972

Following the District Engineers briefing, the meeting was opened to receive written and verbal statements. A summary of pertinent statements have been selected and cited below to reflect the tone of the meeting and to indicate the attitudes and concerns of the individuals who spoke. Like the Indiana meeting held earlier, the speakers were overwhelmingly opposed to the land treatment systems. It should be noted that many of the speakers at this meeting were the same individuals who attended the previous meeting in Indiana. In general the tone reflected a sceptical attitude towards the intent and goals of the study. The statements that were received after the public meeting for inclusion in the final report further underscored this opposition. Duplication of the same questions has been avoided, when possible, in order to better underscore the range of statements presented.

SUMMARY OF STATEMENTS

From the five advisory committee meetings I have attended, there appears to be strong urging by the Army Corps of Engineers for all affected governmental and public agencies to accept and advocate the "living filter" proposals.

By the use of this proposed method of treatment, a high quality effluent is expected at a cost less than that of any other known method of treatment. The lands expected to be used are those which at present return generally a low cash crop. The effluents are also expected to be used in the cooling of nuclear powered generating stations and finally, the treated waters are to be collected and returned as needed to Lake Michigan and the urban streams. These are the positive aspects of this proposal.

A number of problems currently facing C-SELM area would appear to be solved. Sludge is disposed of in an acceptable manner, the effluents would meet the no discharge of critical pollutants standards, the urban streams would be revitalized, power could be generated without the thermal pollution of existing waterways, and a poor soil would be enhanced to produce a higher yield of cash crops. This program is conceived to solve the wastewater and urban runoff problems for a fifty year period (to 2020).

These are high and true goals to attain and should not be diminished by any governmental or civic groups. However, before acceptance and

advocation of the "living filter" method of obtaining these goals, let us consider some of the negative aspects of the concept.

1. The Corps has said that 780 square miles of land would be sufficient for this process. A similar operation in Fredricksburg, Texas, proved to be an efficient and economical venture. However, the practical rate of application in that arid area was found to be a rate of less than 8 feet per acre per year. Using that same figure and deleting the approximate 3 feet of rain per year for this area, the flows expected in the year 1990 will require some 1,280 square miles and in 2020, some 1,420 square miles (not 780 square miles as proposed).

2. Most, if not all, public health departments will not permit spray irrigation of sewage for crops grown for human consumption. In the Texas case, the irrigation crops were restricted to grasses and hay. Even the grazing of cattle was found to be impractical immediately after irrigation, for the ground was too soft to support the animals without damaging the turf.

3. There has been no evidence to date presented that would indicate that trace metal and chloride buildup are not a problem.

4. The Corps has presented a vast array of costs which appear to prove the "living filter" is the more economical method. If, however, the sewage application rates per year are true figures, the concept is approximately 45 percent short on land area and the costs would of necessity be then at least $900 million per year, not $511 million per year as indicated.

5. Possibly the most difficult aspect to reconcile is that once this course is chosen, the path is irreversible. To date, all planning has been done allowing for the greatest number of alternatives. The "living filter" concept allows for no alternatives once the trunk sewers are under construction.

6. A project of this size and impact should adequately answer and prove the following prior to instituting the program:

a) Ground water supplies will not be contaminated.
b) That the influx of this volume of added water will not adversely affect the climatic conditions.
c) That the soils, in fact, will perform as the preliminary studies indicate.
d) That this project does not have any unforeseen effects.

The basis for this study is completely in error. It is based upon the predication of continuously enlarging everything into a great central funnel. The program of complete decentralization should be given very, very serious consideration. To give you an example of what we mean by that, we believe that each individual family dwelling unit . . . should possibly be looked at as processing its own waste products. We also realize that we have problems with the existing facilities here in Chicago. One of the things that should be looked at in the concept should be the development of our industries. Their plants become obsolete. Perhaps some of this vast amount of money that is proposed should be allocated to these industries. As they approach obsolesence, they would be partly reimbursed to relocate to the suburban areas of more open space. The area where the old plants were located could then be utilized for more open space, storm water storage, and processing of the waste products. Industry would benefit by this, the community would be opened up and become more livable, and we would solve many of the other problems at the same time.

The Corps study, as released in its brochure for this meeting, obviously favors land treatment of all municipal and industrial wastes and stormwater. Its cost analysis and pollution removal efficiency studies give first priority to land treatment over advanced physical-chemical and advanced biological systems with the discharge of effluents to the waterways. The League of Women Voters is not wedded to conventional technologies as the only answer to wastewater management nor can we advocate land treatment without careful, critical analysis of its advantages and disadvantages. Although we have some scientific expertise in our membership, generally speaking we want the final scientific decisions on land treatment efficiently and safety made in the laboratory.

The advantages and disadvantages of land treatment vary from place to place and are not limited to treatment efficiency and economy of operation. They are social and political. Several of our local Leagues in other states are supporting land treatment systems for much smaller areas than the C-SELM region where political jurisdiction is limited and land use is not a critical problem. Our McHenry County League has begun a study of the Hebron, Illinois project which we view as an important microcosm for the concept in Illinois. We understand the Hebron project has received both Illinois EPA and NIPC approval. We do not know if the federal EPA has approved a construction grant but understand that the EPA will consider municipal applications for land treatment systems on a case-by-case basis. The League agrees with this philosophy.

Land treatment of municipal wastes can be compared to agricultural utilization of animal wastes in the confined feedlot operations of the

plains states. There is a great social difference, however. Agricultural wastes are locally generated in the economic process; municipal wastes are externally imposed on the agricultural community in the land treatment process. That municipal wastes result in part from agricultural economy and have an economic value to agriculture is not the political issue and decisions will be made in part on political realities. It is the Corps' responsibility to carry its message to agriculture and secure its concurrence before any recommendations are made.

I question again the motives and capability of the Army Corps of Engineers for planning on the scale involved in the C-SELM study. For the reasons outlined below, I believe that the citizens of the C-SELM study area should insist that Congress refuse either to authorize further regional wastewater management studies elsewhere or to extend the C-SELM study in particular beyond its present stage until the essential condition of local agreement and participation is met. The need for this condition will be amplified after discussion of my objections to the C-SELM study as it has been conducted so far. There are three bases for my objections:

1. The regional wastewater management studies represent the effort of the Corps to reinforce and extend its authority over the waterways in spite of the costly, destructive and often ineffective consequences of use of previous authority.

2. Application of land disposal as the principal means of waste disposal on the scale advocated by the Corps is at best premature and at worst involves deliberate deceit to Congress and the nation.

3. Failure to obtain approval for the study in advance at the state, regional and local levels demonstrates the Corps' greater concern for perpetuating its own bureaucracy than genuine concern for dealing with wastewater problems, and may even inpede the national effort in this regard.

I urge that the Corps' clumsiness not mislead us prematurely to discard land disposal altogether. Rather let us urge our other federal, state and local agencies to assist and allow those communities that want to try it on their own to do so, so that we may profit from their experience. From a few hundred acres at Penn State to the most industrialized and one of the largest nations in the world is too big a jump for application of any technology at one time.

Any nation that is capable of all the astounding feats in space that we have accomplished in the past few years can surely develop a system

more satisfactory than the living filter. We challenge you and all our engineering colleges to develop and apply the technology to produce a system that would be acceptable to all the communities involved . . .

One problem for livestock feeding operations is the strict Federal laws covering cattle and hog feeds. If effluent is applied, the ground could not be grazed because of the nitrogen. Also, we get between 25 and 30 inches of rain per crop season. Under the Corps' program we would get 75 to 100 inches more on our soil for a total of 100 to 130 inches of water. Of course our ground cannot drain this amount.

As a farmer living in the area south of the Kankakee River, I strongly oppose the living filter Plans H, I, J and K. In regard to usage of the sludge produced from the living filter system, the land in question is already a highly productive soil and is not in need of sludge to raise high yielding crops. This is being done right now with the aid of commercial nutrients. As a cattle feeder, I know about wastewater. This sludge is not worth the time and effort that it would take to apply it, not to mention the adverse effects this sludge would have in crop production over a period of years. The living filter concept of water treatment should be classed as a nusiance.

QUESTIONS AND ANSWERS

The questions and answers that followed are summarized below. At the conclusion of the statement period, the meeting was held open for questions.

Q. Was there a soil survey taken of this area?

A. Yes.

Q. The whole area, Northern Jasper, Starke County, and Newton Counties?

A. We worked from the basis of existing soil reports supplemented by a soil geologist.

Q. There are new schools built lately within the application site which are bonded. How do you propose to take care of such a sitation, for example, if you take just half of a school district?

A. We're not saying that everything in that area would be involved where we identify a large area. Obviously, it couldn't be because such things

as parks and cities are in these areas. The area we identify on maps is just a general area . . . in which you might locate the land sites.

Second, we would anticipate, regardless of what real estate option is found to be most pleasing, that if such an alternative was adopted the people would continue to farm the land and thus continue to need the schools. Therefore, the fact that schools are being constructed offers no problem.

Q. Japan treats their ground with the same substance we're talking about here and we were not allowed to eat any of the products. Why should we as farmers put it on our ground?

A. If you saw what I saw in Japan twenty years ago with the honey buckets what you're talking about is the collection of human waste and the application of that raw sewage to the land. That's entirely different than any of the schemes that we or anyone else has talked about here in this Country.

Q. Who is going to be involved in this decision-making process that will take place in the next two weeks which will bring this down to five plans? Will any of us who are most affected by these plans be involved in this decision making process?

A. We have gone to all the different sources of information that we can get. We've gone to two public meeting and to three committee meetings. We're going to a fourth committee meeting tomorrow. Once we have received the input of all of these then we will reduce the alternatives to five. It will basically then be a matter of going through many different kinds of evaluations and ideas to arrive at which alternatives should be carried forward for a final evaluation. One of the objects of the screening process is to maintain all of the different technologies so that they can be compared in the final report, which means that there will be at least one advanced biological plant alternative; at least one physical-chemical plant alternative; at least one land treatment alternative; and at least one existing standard, conventional biological alternative in these five. But, it will be up to the various people I have working for me to give a recommendation as to which of these alternatives will be included in the final five that will be presented in the study. It is not a decision as to what will be implemented. It is just a decision of what will give the best spread of alternatives for comparisons and detail study in the final report.

Q. Do you anticipate proposing Federal legislation which would supersede any State laws in this particular matter?

A. No. We're not in the business of proposing Federal legislation or changing laws.

Q. You stated that the first two and a half inches of runoff would be collected. You know what kinds of rains have been going on here lately? Is that two and a half inches every day? Or two and a half inches from each storm? What would happen in the event that a major storm in the study area resulted in quantities of water being transported to the lagoons in excess of the lagoons capacity? Would the lagoons be allowed to spill over raw sewage, rather than not sending the water and releasing it untreated to Lake Michigan?

A. The two and a half inches of runoff should be differentiated from two and a half inches of rainfall. When rain falls on the ground a good portion of it is soaked up by the ground and the excess amount runs off, particularly in paved areas. Hence when you collect two and a half inches of runoff you collect a rainfall runoff equivalent to the majority of the storms that would occur in the urban area. If you get a storm larger than two and a half inches, this excess rainfall would run off into the metropolitan area streams . . . The captured runoff is collected and held in local area impoundments until it can be treated. So, it has nothing to do with overloading lagoons at the land treatment area. Those lagoons have five months storage capacity and would only be fed this runoff when they could safely handle it. Basically flooding would be very greatly reduced because the first two and a half inches of runoff would not reach the streams. If you did get more runoff than could be taken by the storage areas, then it would be bypassed to the streams. The capacity is equivalent to two and a half inches of runoff. If you had a big storm and then you got another big storm the next day, the runoff in excess of two and a half inches for both storms less the amount which could be safely treated the first day would be bypassed to the metropolitan area streams.

Q. How can we possibly farm with another seven inches of water in addition to what we get now? It would be impossible to farm that land.

A. . . . This is exactly the same kind of comment that we heard from the farmers in the Muskegon County project. They said we were crazy to go out there in those swamps and propose to irrigate. They said they had difficulty with all of the water that was out there and you couldn't drain that land. They tried it. The interesting thing is it is now drained. They're quite surprised. It has dried up and one is able to carry more water through the given soils simply by improving the drainage capacity.

This is the answer that we give you on this. Your present problem is simply due to inadequate drainage.

Q. Why should you have to condemn a farmer's land? Why shouldn't you have something that they'd be happy to get from you? Why don't you do a better selling job? The Corps of Engineers could do that.

A. What we want to do is not just a selling job because I'm not advocating any final solution at this point. We are a long way from that in our study. What we have to do is talk together to ascertain the negative and beneficial aspects. There happens to be a lot of plusses along with the minuses in these particular systems. Right now, we're concentrating on all the possible minuses, and this is the kind of thing we have to discuss because I think the day will come when people may be competing for this kind of free fertilizer and free drainage system that will be paid for by someone else's municipal treatment system. But we're not saying that . . . the best solution would be to buy the land and take it away. One of the things we want to talk about with the agricultural interests is if you did have such a system what would you think would be the best system? Would it be perhaps an option where you can either go under an easement? Or, if you wanted to, you could just go ahead and sell your land and get out. It doesn't necessarily have to be the same system for everybody. But, these are the kinds of things we want to talk about.

Q. . . . You've been concerned mainly with conserving nature and returning things back to nature and purifying nature. Now, I wonder about the possibility of having control of 700,000 acres of nature at your disposal. What if this didn't work? Would this land be recallable if the woods became sterile? What could you possibly do to reclaim it?

A. The operation of these systems would call for a very extensive monitoring system of what's going on-- what chemicals, if any, are being taken up in the soil, what constituents, if any, are getting down to the saturated zone below the soil, etc. This would be maintained in such a way that long before any problems could develop they would have been stopped; and there are methods to stop these problems. If something was going through the soil and getting down to the ground water table, it could be recirculated to eliminate it. If you find you're getting some heavy metals, for example, that you hadn't thought of that's beginning to build up in the soil and cause a problem, then you got to pre-treat to stop the application of that heavy metal.

So, its through the monitoring system that you determine long in advance of any problems developing, exactly what is going on in your soil. If you have to make a correction, you make it. There isn't any question of sterilizing huge areas. There's just no reason why this

should happen considering the rate at which these processes take place and the kinds of monitoring which would go on.

Q. What are the dimensions of the lagoons and how close can people live to one of them and be comfortable the year around?

A. The lagoons are about 3-miles on a side. That would be nine square miles in one lagoon. We've put a buffer area of 1 mile around it. Normally, the lagoons do not have any odor problems. The ones that have given problems are the ones that have become overloaded. Our design was based on keeping the loading down to what is regarded as safe. I believe you could safely live immediately adjacent to such a lagoon, and the reason we've put buffer zones around it is partially to provide a space for possible utilization of the sludge at that point, since one of the more economical ways of handling the sludge is to plow it into the ground adjacent to the lagoon. That way you cut down on the transportation cost.

Q. How many of these lagoons do you have figured for the "H" Plan?

A. I believe there are eight lagoons. Each 9-square miles, making a total of 72-square miles.

Q. How much do you plan on lowering the water table in our area?

A. The land system design is to maintain a water table from 5' to 7' below the surface of the ground.

Q. You realize there could be a danger there? You'd kill every tree in the area by lowering the water table that much?

A. No, we have not seen that as a danger. We're not lowering the water table in the entire area. When you get outside of the area where the water table has been lowered, your gradient goes back up. At a distance outside of the agricultural area the water table is right back up to its normal level. This is one of the design considerations. Therefore, any water that flows will flow towards the area. We won't have any flows going out of the area.

Q. What about the trees in the agricultural area, around the homesites, etc?

A. Well, are there some specific trees that have to have water higher than five feet?

Q. An Oak Tree. You can't lower the water level in the ground more than five inches a year or you'll kill it.

A. This is a new fact that you've brought out that we will make note of.

Q. With ninety inches of water being sprayed on our fields all summer long, how are we going to combat the molds, the fungus, the corn blight and all these other bacterial things?

A. The water isn't sprayed continuously, but it is put on by about an inch at a time once every other day. The time it takes to put the inch on is very short. The machine would pass over a given area in a matter of a few minutes. So, it isn't a question of just maintaining the spraying continuously. Relatively short doses are given and then it goes into the root zone, and as long as you maintain good drainage it has plenty of open space to go on down into the soil.

Q. Did you ever stand in the middle of a corn field after it rained an inch even for the following day? The steam just rises up out of there. And I think you'd have the same problem now. This doesn't just disappear.

A. The difference is that you do not have a space for it underneath. If you have adequate drainage, you have the space for the water to percolate down through.

Q. You said before that the soil would not absorb the salt in the water. If this is true, we're going to be drinking salt water.

A. That's the point. We have to be careful what we call salts. I don't want to give you any misconceptions of what I mean by that. We mean the refractory salt materials. The sodium chlorides, sulphates, bicarbonates, etc. Those things that are not held by the soil system by one mechanism or another, and that pass through. By the same token they don't accumulate either and they don't get concentrated in the flow. They're no more concentrated in the collected underdrain water that comes out of the soil system than goes in.

Q. Who would pay for the irrigation rigs and the upkeep and labor of putting it in?

A. The operator of the system would, . . . not the farmer. The cost of maintaining the rig and operating it, etc., is charged to the people that put the wastewater in the systems.

Q. What's going to happen to the wildlife?

A. There's no reason why you shouldn't continue to have it in abundance.

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Q. What's going to happen to the wildlife?

A. There's no reason why you shouldn't continue to have it in abundance.

Q. How can you have wildlife with a 140 inches of rain a year?

A. In the Penn State they have not noticed any negative impacts on the wildlife. In fact, there has been some talk of positive impacts. I've never seen anything to indicate that you would have less pheasants or any other types of game bird or game animal because of this.

Q. What about your migratory waterfowl? Would they land in these 9 square mile lagoons, or would they not?

A. They would be attracted to them. I know that the migratory waterfowl are attracted to the sludge lagoons of the Metropolitan Sanitary District every year, and they are also attracted to one of the lagoons that we have. Of course, the effluent lagoons that we're proposing with this project have a lot lower strength of waste in them than the sludge lagoons. Sludge lagoons are pretty concentrated. Yet ducks do land in them and take off again. If they get caught in the sludge, it is possible that they would be trapped. In water, they aren't.

HAMMOND, INDIANA
September 14, 1972

LIST OF PERSONS PRESENT

CORPS OF ENGINEERS REPRESENTATIVES

Colonel Richard M. Wells, District Engineer, Chicago District, Corps of Engineers, Chicago, Illinois (Presiding)

Major LeRoy R. Hayden, Jr., Deputy District Engineer for Civil Works, Chicago District, Corps of Engineers, Chica go, Illinois

Mr. James M. Maas, Chief, Planning Division

Mr. Carl Hessel, Planning Division

Mr. Imre Szekelyhidi, Planning Division

Mr. Milo F. Ryan, Public Affairs Officer

Miss Neola M. Eichmeier, Public Affairs Office

Consultants to the Corps of Engineers

Dr. William J. Bauer)
Dr. Donald Matschke) Bauer Engineering, Inc.

FEDERAL GOVERNMENT REPRESENTATIVES

Mr. James Clarke, Soil Conservation Service, Rensselaer, Ind.
Mr. Daniel L. Freeland, Representative, Senator Birch Bayh
Mr. Roscoe Fisher, USDA (ASCS)
Mr. Donald W. Hook, Planning Branch, US, EPA
Mr. Evart R. Kessler, Soil Conservation Service, USDA
Mr. John D. Kessler, District Director ASCA, USDA
Mr. Stephen R. Qualkinbush, District Conservationist - SCS - USDA
Mr. J. Lawrence Turnquist, Lake County ASCS)
Mr. Charles Walker, District Conservationist - SCS - USDA

HAMMOND, INDIANA
September 14, 1972

LIST OF PERSONS PRESENT

STATE REPRESENTATIVES

Hon. Walter J. Roorda, State Representative
Hon. William Christy, State Senator
Hon. Paul Hric, State Representative
Mr. Eugene W. Waltz, Senior Planner - Div. of Planning
Mr. James O. Russell, Head, State Water Plan Section
Indiana Department of Natural Resources

Mr. James Brentlinger, Extension Agent
Mr. Lynn Busse, Coop. Ext. Service
Mr. Jerry V. Mannering, Agronomist, Purdue University - Extension Agency

Mr. Jack M. Hart, Area Extension Agent - Coop. Ext. Serv.
Mr. Paul Wharton, Cooperative Extension Agent
Mr. Harry M. Galloway, Soil Scientist - Purdue University

CITY, COUNTY and MUNICIPAL REPRESENTATIVES

Mr. Todd A. Wikle, Jasper County Sanitarian
Mr. Lloyd A. White, Planning Commission, Porter County
Mr. John S. Vasconi, Chairman, Region Planning Commission
Dr. Herbert Afkes - Starke County Health Office
Ms Carol Tanner, Kankakee Valley Commission
Mr. Gilbert Stiener, Lake County SWCD
Mr. Wm. F. Ramey, Chairman, Jasper County Soil & Water Conservation District
Mr. Walter Miller, Newton County Commission
Mr. Harold Duttlinger, Supervisor, SWCD
Mr. Kenneth Cypa, Resource Planner - Lake Porter Regional Planning Commission
Mr. Daniel L. Conrad, Soil Conservationist - Jasper SWCD
Mr. Charles Brucker, Planning Board - Pulaski County
Mr. Carrold Bledsol, County Commissioner, Jasper County
Mr. Jacob Bonstra, Sanitarian, Newton County Health Dept.
Mr. William A. Macaitis, Engnr., Metropolitan Sanitary District of Greater Chicago

HAMMOND, INDIANA
September 14, 1972

LIST OF PERSONS PRESENT

CITY, COUNTY and MUNICIPAL REPRESENTATIVES

Mr. David M. Williamson, Township Trustee, Beaver TWA
Newton County

Mr. Dale Topp, Clerk-Treasurer, Town of Francesville
Mr. James Spurr, Town Board Planning Commission,
Hebron Town Government

Mr. Robert L. Schultz, Town Board Member, DeMotte, Ind.
Mr. Edson W. Murray,
Hon. Richard C. Collins, Mayor, Crown Point, Indiana
Ms Anne Collins, Director, Lake Ridge Headstart
Mr. Lee Chambers, Asst. Supt. Sanitary District
Mr. Eugene E. Bushman, Lake Township Trustee
Mr. Lealon A. Bottom, DeMotte Chamber of Commerce
Mr. Frank J. Bahleda, Sr., Sanitary District, Gary, Ind.
Mr. John Marsh, President, DeMotte Town Board
Ms Geraldine Kortokray, Clerk - Treasurer, Cedar Lake, Ind.
Mr. Gerald F. Johnson, Supt. Sanitary District of Hammond
Mr. Phil Jaynes, Vice Chairman, Little Calumet River Basin
Commission
Mr. James W. Halley, Pres. Town Board, Dunes Acres
Mr. Richard G. Galambos, Town Trustee, Griffith, Ind.
Mr. Thomas Fisher, Attorney, DeMotte Town Board
Mr. John Fase, DeMotte Chamber of Commerce (President)
Hon. Emmett W. Eiger, Mayor, City of Rensselaer

ALL OTHERS

(See Attendance List available upon request)

Chicago, Illinois
18 September 1972

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CORPS OF ENGINEERS REPRESENTATIVES

Colonel Richard M. Wells, District Engineer, Chicago District, Corps of Engineers, Chicago, Illinois, (Presiding)

Major LeRoy R. Hayden, Jr., Deputy District Engineer for Civil Works, Chicago District, Corps of Engineers, Chicago, Illinois

MG Ernest Graves, Division Engineer, North Central Division, Corps of Engineers, Chicago, Illinois

Mr. James Maas, Chief, Planning Division, Chicago Distrdict, Corps of Engineers, Chicago, Illinois

Mr. Milo Ryan, Public Affairs Officer, Chicago District, Corps of Engineers, Chicago, Illinois

Miss Neola Eichmeier, Public Affairs Office, Chicago District, Corps of Engineers, Chicago, Illinois

Mr. Philip McCallister, Chief, Engineering Division, Detroit District, Corps of Engineers

Mr. Carl Hessel, Planning Division, Chicago District, Corps of Engineers, Chicago, Illinois

Mr. Imre Szekelyhidi, Planning Division, Chicago District, Corps of Engineers, Chicago, Illinois

Mr. Bill Sanders, Planning Division, Chicago District, Corps of Engineers, Chicago, Illinois

Mr. Bill Hanson, Planning Division, Chicago District, Corps of Engineers, Chicago, Illinois

Consultants to the Corps of Engineers

Dr. William J. Bauer)
) Bauer Engineering, Inc.
Dr. Donald Mtaschke)

Chicago, Illinois
18 September 1972

LIST OF PERSONS PRESENT

FEDERAL GOVERNMENT REPRESENTATIVES

Mr. John R. Mayfield, Staff Assistant, Senator Adlai E. Stevenson III

Mr. Joseph Comella, Staff Member, Congressman Roman C. Pucinski

Mr. Lynn M. Gericke, Administrative Director - Chicago Office - Senator Charles Percy

Mr. Harlan D. Hirt, U. S. EPA - Region 5

Mr. Robert Chandler, National Park Service - USPI

STATE REPRESENTATIVES

Mr. Albert W. Forslev, Prof. of Earth Science - Northeastern Illinois University - Village of Riverwoods "ACRE" Committee

Mr. Walter J. Roorda, State of Indiana Representative

Mr. John L. Swartz, Staff Aid, Ill. House of Representatives

Mr. Thomas R. Wiles, Illinois Department of Business & Economic Development

CITY, COUNTY and MUNICIPAL REPRESENTATIVES

Mr. Ned P. Becker, Public Works Director, City of Naperville

Mr. Jack W. McCormack, North Shore Sanitary District

Mr. Walter Buczek, Trustee Cass Township, Pulaski County

Mr. Robert J. Conway, McHenry County Regional Planning Commission

Mr. Bernard H. Cooper, Assoc. Sanitary Engineer, Metropolitan Sanitary District

Chicago, Illinois
18 September 1972

LIST OF PERSONS PRESENT

CITY, COUNTY and MUNICIPAL REPRESENTATIVES (cont'd)

Mr. Milton DeVries, Jasper County

Mr. Conrad F. Floeter, County Board Member (McHenry)

Mr. Robert E. Gildroy, Chicago Association of Commerce and Industry

Mr. Glenn C. Hamilton, County Board of Iroquois County

Mr. Mark D. Herriott, Executive Secretary, Watseka Chamber of Commerce

Mr. Roy Kingma, DeMotte Town Board

Mr. Ed Klasinski, Director of Public Works, Village of Deerfield

Mr. & Mrs. Charles Liebman, McHenry County Planning Commission

Mr. Clarence W. Mack, Executive Director, N. E. Illinois Nat. Res. Service Center - Kane DuPage Soil and Water Cons. District

Mr. Kelly W. McClain, McHenry County Regional Planning Commission

Ms. Karen S. Moore, Asst. Planner, McHenry County Planning Commission

Mr. John R. Quay, McHenry County Planning Commission

Mr. Robert E. Silhan, McHenry County Planning Commission

Ms. Marianne Zolna, Asst. to the Village Manager, Hinsdale

Mr. Donald Eddy, Illinois Association of Sanitary Districts.

NEWS REPRESENTATIVES

Mr. Roy L. Baron, Managing Editor, Kankakee Daily Journal

Ms. Sally McMurry, Columbia Broadcasting System

Ms. Pennie Taurman, Associated Press

APPENDIX H

PUBLIC INVOLVEMENT/PARTICIPATION PROGRAM

STAGE V: AGRICULTURAL DEVELOPMENT

The material presented herein is a summary of the interaction with the public during the fifth stage of the study. As such, the material is presented in four main parts as follows:

Part 1 - Agricultural Work Group Meetings
Part 2 - 18 December 1972 Letter From Dr. Harry M. Galloway, Cooperative Extension Service
Part 3 - 5 January 1973 Letter of Response to Dr. Harry M. Galloway
Part 4 - 2 February 1973 Letter From Mr. Robert D. Walker, Cooperative Extension Service

WASTEWATER MANAGEMENT STUDY

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

STAGE V - PART I

AGRICULTURAL WORK GROUP MEETINGS
(LAND SITE AREAS UNDER STUDY)
(Summary of Meetings)

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

8-10 January 1973

Preface

On 8, 9 and 10 January 1973, three separate meetings were held with representatives of the involved agricultural communities surrounding the Chicago-South End of Lake Michigan study area. Two of the meetings were held in Illinois and one in Indiana. The sites were selected for the convenience of the members in order to reduce the travel time involved.

Each of the three meetings covered the same topic: a brief summarization of the wastewater management study and its current status; and a discussion of a paper entitled "The Use of Land As A Method of Treating Wastewater (Its Meaning To The Agricultural Community)." The paper explained the design concepts of the land treatment technology and illustratively demonstrated how the system could be operated if selected and implemented by the States and local governments. A copy of the paper prepared by the Chicago District was furnished all invited participants for their review prior to the meetings.

The purpose of the meetings was to develop a working dialogue with a cross-section of the local agricultural community and to better ascertain their viewpoints and concerns regarding those alternatives which involve the land treatment technology. The information obtained from these work groups was to be used as input to the final technical design and the social and environmental assessments of the land-related alternatives.

A summary of the three meetings is presented herein. Section I summarizes the Corps of Engineers' presentation. Sections II, III and IV document the comments of the three work groups during and subsequent to the presentation. A list of the participants is included with their respective work groups. Duplication of the same questions has been avoided, when possible, in order to better underscore the range of questions and answers.

TABLE OF CONTENTS

SECTION I - CORPS OF ENGINEERS' PRESENTATION

INTRODUCTION

Col. Richard M. Wells (Deputy District Engineer Major L. R. Hayden, Jr. for the Joliet, Illinois meeting) began the work group session by citing the Congressional resolutions which authorized the Chicago-South End of Lake Michigan (C-SELM) area wastewater management study. The directive given for this study coincides with the newly enacted Federal Water Pollution Control Act Amendments of 1972 which:

- established the national goal that the discharge of pollutants into navigable waterways be eliminated by 1985.
- identified a national policy that area wide waste treatment management planning should be developed and implemented.
- and requires that no Federal wastewater construction grants be made after 30 June 1974 without demonstration that alternative wastewater management techniques have been studied and evaluated, and that the work proposed will provide the best practicable waste treatment technology.

Col. Wells indicated the Chicago District was evaluating alternative systems capable of meeting these goals within the overall framework of the water and land-related needs of the C-SELM study area. The evaluation will ultimately involve an assessment of each alternative system's impact on the area's social, environmental, economic and institutional structures. Additionally, the resource commitments associated with each alternative in terms of tax dollars, energy requirements, land requirements and other natural resources will be identified. In this way the study will provide detailed resource planning input to the State and local agencies responsible for wastewater management decisions while at the same time helping them meet the demonstration requirements for construction grants under the 1972 Act.

STUDY BACKGROUND

The three treatment technologies which can be employed today to achieve the elimination of pollutant discharge standard were identified and the functional design and operations of each described. These included the Advanced Biological and the Physical-Chemical treatment plant technologies and the land treatment technology. The components of the three technologies are not new; each has been used separately in existing treatment or test facilities. What is new is the scale and configuration of design being considered for each technology. While sufficient data is available for sound planning, additional design and operational information will be required. Therefore, the study will identify a phased development program for each alternative that will include the construction, operation, and testing of pilot treatment facilities.

PROGRESS TO DATE

The study approach used in developing the alternative wastewater management systems was outlined. Beginning with 19 initial alternatives, the process for screening and eliminating the least promising systems to an intermediate level of eleven and subsequently to the final number of five was explained. Then the five alternatives retained for final study were described. First, the features common to all were discussed. This included the disposal of a treatment by-product--solids known as sludge--for either the environmentally-preferred operation of reclaiming land (strip-mined) areas or agricultural usage as fertilizer. Another common feature is the collection and treatment of the first two and one-half inches of storm water runoff in the urban areas.

Alternative I is a compilation of existing regional plans which employ 64 conventional biological plants to meet existing State wastewater standards. This alternative is of particular value in comparing the social, environmental, economic and resource consumption implications associated with the other alternatives.

The remaining four alternatives are designed to achieve a higher treatment standard, i.e., elimination of critical pollutants. They all include such common feature as:

- collection and treatment of approximately the first 2.5 inches of storm water runoff from the suburban and rural areas.

- water reuse to satisfy all needs forseen through the period 2020.

- concurrent flood control from the collection of storm water.

Alternatives II and III employ 33 physical-chemical and 17 advanced biological treatment plants within the C-SELM area, respectively. The number and location of these plants were based on an analysis of previous plant combinations varying in number from 8 to 64. Alternative IV similarly involves only one treatment technology--that of land. The largest of the six sites considered is in Indiana, south of the Kankakee River. The rest are located in Illinois: an intermediate-sized site in the Grundy-Will-Kankakee County area; and smaller ones in Kendall and McHenry (3) Counties. The last alternative (V) combines the plant and land technologies. It includes an advanced version of the five major biological treatment plant facilities belonging to the Greater Chicago, Hammond and Gary Sanitary Districts, with smaller versions of the six dispersed land treatment sites for the remaining outlying areas.

The design and multiple impacts associated with each of the five alternatives are now being refined in detail. At the same time the Chicago District has changed the basis for planning and designing the land system. This change was in response to a number of questions and concerns raised in regard to the life-style of the agricultural community. As a result, a paper has now been prepared which describes the concept and

meaning of the revised land treatment system to both the participating farmer and other residents of the rural area. The data presented in this paper is preliminary and subject to further revision during the final study stage.

During the three sessions, the agricultural paper was presented to work groups made up of farm leaders from each of those areas that include potential land treatment sites. By having a mutually beneficial discourse, the advantages and disadvantages of the land treatment system were better defined. Then following these work group sessions the Chicago District will meet with the public in these same farm areas to solicit their viewpoints.

LAND TREATMENT CONCEPT

The land is the final stage in a three-stage treatment process. During the first two stages, the wastewater is treated before being applied to the land; the equivalent of primary and secondary treatment provided by the aeration and storage lagoons, respectively. The final stage of advanced treatment takes place as the secondary effluent (water) moves down through the soil to the underdrain or well system -- there to be collected and returned to the C-SELM area. The soil particles act as a filter, mechanically straining the solids suspended in the water; however, most of the dissolved solids will pass through the soil column. The clay and mineral particles also adsorb the bacteria, viruses, and other constituents in the effluent with an ionic holding strength which can vary from a loose bond that temporarily holds some pollutants to a tight-bond that permanently fixes other pollutants in the soil. Soil microorganisms consume dissolved organic nitrogenous and phosphorus materials, converting them ultimately to a form capable of being taken up by the root system of the cover crops.

The oil and greases in the applied effluent are retained in the soil column and ultimately degraded by the soil microorganisms. Similarly, the bacteria and viruses not killed by chlorination are trapped by the soil particles and consumed by the soil microorganisms. Other key constituents such as phosphorus and heavy metals are adsorbed by the clay and/or other mineral particles in the soil column. The level of phosphorus in the applied effluent is sufficiently low and the amount of clay particles in the soil adequate enough to provide a fixed bonding capacity during the economic life of the land system, i.e., 50 years. Most of the metal ions also are irreversibly fixed in the soil, though some may be taken up by the crop as actual nutrients. Research by the University of Illinois indicates that adsorption of heavy metals within the soil will not be a problem in a system that maintains a balanced nutrient program and provides a proper crop environment. However, changes in the soil would be monitored to prevent a long-term build-up of any constituent to undesirable levels.

In summary, the treated secondary effluent is suitable for use as a crop fertilizer since it includes a low, balanced content of nitrogen,

phosphorus, potassium and other plant nutrients. The critical constituent for system design is nitrogen with the rate of application adjusted in relation to the holding mechanisms of the soil's microorganisms, volatilization, and the time-phased nitrogen uptake of the selected cover crops.

ILLUSTRATIVE CROPPING PROGRAM

The paper presents an illustrative design of a land system. The adopted crop pattern determines the nitrogen uptake capability of the crops which in turn establishes the desired effluent application rate and amount of irrigation lands. The type of tillage was first discussed. Two illustrative types were considered--no-tillage and conventional tillage. The comparative advantages of these two extremes for use with the system were identified, particularly in regard to (1) improving soil tilth, organic matter and soil microorganisms; (2) reducing soil erosion losses (wind and surface runoff); (3) increasing the capability of the soil to hold and the crops to take up nitrogen; (4) reduced time in the field; (5) the use of additional chemicals for plant and insect control; and (6) higher seed costs.

The criteria pertinent to selecting a suitable cropping program was outlined. Included were such considerations as: the crops should have a high value per acre, have comparatively high nitrogen uptake capability, be suitable for irrigation, and be able to be grown on a continuous and calendarized basis. Accordingly, a double cropping program of corn and rye was selected to illustrate how the system would work. Early maturing (100-110 day) hybrids of No. 2 corn was selected as the main cash crop. A planting population of 26-28,000 per acre and row spacings of 30 inches or less were recommended along with the rationale for this type of planting program. The importance of the rye as a cover crop protecting against erosion losses and the high carbon-nitrogen value of its residue to help temporarily bank (immobilize) the applied nitrogen was explained. The rye's potential for harvesting the fall growth as forage for beef feed was also discussed in light of suggestions from State of Illinois agricultural officials.

Based on the foregoing, a nitrogen budget equivalent to 615 pounds per acre was developed for the total crop system of corn and rye. Differentiation was made between the 115 pounds of nitrogen that would remain in the field as crop residue and thus be recycled and the 500 pounds of nitrogen that would be utilized or removed from the system. Further breakdown of the nitrogen losses involved the equivalent of 300 pounds removed from the field when harvesting the corn grain and rye forage; volatilization losses amounting to 150 pounds and attributable to both evaporation and gasification action that occurs at the surface and internally within the soil, respectively; and 50 pounds per acre which are lost in the form of nitrates in the final effluent. This latter figure is equal to or less than 2 mg/l--the constituent level of nitrogen acceptable under the no pollutant discharge standard. Assuming the nitrogen outtake of the two-crop system is to be provided by the applied effluent, some 134 inches/acre/year will be required.

SYSTEM DESIGN CONSIDERATIONS

To calculate the average and peak application rates of the irrigation system, consideration was given to the crop nutrient uptake requirements; the infiltration rate of the soil surface; the percolation coefficient for water moving through the soil column; water movement rates through the underlying aquifer; the frequency, intensity and duration of rainfall at the land site; and projected evapotranspiration losses. To meet the design criteria, both sandy loam and silt loams overlying sand deposits were selected as the basic soil types. This permitted adoption of both an average and peak application rate equivalent to 0.65 inches/day or 4.5 inches/week and 0.86 inches/day or 6.0 inches/week, respectively. With these rates, the time-phased nitrogen requirements could be satisfactorily met, within the rainfall pattern of the site.

For illustrative purposes, a center-pivot irrigation system was used for applying the treated effluent to the land. The radii of the rigs varied from between 1,000 to 2,000 feet in length, depending on the field configuration. Special type nozzles suspended on spray bars capable of being adjusted as close to the crop canopy as efficiency allows, were used to control both the droplet size and drift. These spray bars are hung from trusses spanned between self-propelled towers and the spray rates are varied over the length of the rig to achieve a high uniformity of coverage.

The success of the irrigation system is dependent upon the installation of an effective field drainage system. With a shallow underlying aquifer, polyethylene pipes with fitted nylon filters would be used. With an underlying aquifer located over 10 feet deep, a system of wells would be used. The drainage system is designed to maintain at least a five-foot deep zone of aerated, unsaturated soil. Moreover, the ground water cannot rise within three feet of the soil for more than 48 hours. These two design criteria provide protection to the crop's root zone and apply equally to the applied effluent and the rainfall experienced at the land site. To further insure the integrity of the drainage system, the spacing and depth is designed to control the groundwater table and maintain a flow into the irrigated areas, thereby assuring capture of the applied water.

Based on the foregoing double cropping pattern, nitrogen requirements, and application and drainage systems, two illustrative calendarized agricultural-irrigation schedules were presented and discussed. The first schedule involved no-tillage practices and the second-conventional tillage. Both were calendarized for two sizes of family farms--250 and 900 acres--representing different levels of labor and equipment capabilities.

PROTOTYPE MODEL

In identifying potential areas for land treatment facilities, consideration was given to such factors as the availability of suitable soil, the cost required to transport water to and from the area, and areas of minimum population concentration. Then, when siting facilities within the selected area, major emphasis was directed to (1) avoiding communities,

public institutions and commercial developments as well as environmentally or ecologically unique lands; (2) maintaining the integrity of the local transportation system; and (3) minimizing disruption to farm homes, farm plants, and local land use.

To illustrate the siting procedure, one of the four or five prototype models being developed was discussed. Out of a rectangle of land containing some 79,400 acres, the irrigation and storage systems would occupy only 32,400 acres. An additional 7,100 acres would be required if the sludge is used in the acres for farming rather than transported elsewhere for land reclamation. The remaining unaffected acreage would include woodlands, farm ponds, green spaces, community development; roads, railraods, and streams; and crop and pasture lands which because of their size, soil type, or location would not be readily adaptable to irrigation.

IMPACT ON THE FARMER

To implement the system, a long-term agreement between the operating entity and the farmer would be required. The participating farmers would have to agree to accept a specified volume of treated wastewater within a specified time framework and to grow and manage suitable crops. In return the operating entity would provide and maintain the irrigation and field drainage systems and provide and aerially distribute the rye seed. Additionally, the farmer could anticipate a gain in net farm income. As illustratively demonstrated, a harvestable yield of 165 bushels of corn per acre could be expected from a planting program equivalent to 200 bushels of corn per acre. This represents a net production gain of 30 bushels per acre over and above what is currently achieved on well-managed farms in the area. At an average market value of $1.06 per bushel, the farmer's annual income thus would increase by $31.80 per acre. Other gains may be anticipated from field production cost savings, primarily from lower fertilizer costs. Depending on the type of tillage practice, the net production costs saving that could be achieved would range from $11.05 to $11.55 per acre over conventional farming without irrigation. These savings were computed using actual local costs and custom service charges from Doane's Agricultural Report. In summary, the participating farmer could expect to receive a net gain in farm income ranging from $42.85 to $43.35 per acre. These figures do not include any income from the rye crop. For the purpose of this study, it has been assumed that the sale value of the rye offsets the rye harvest cost.

IMPACT ON THE RURAL COMMUNITIES

Adoption of a land treatment system could serve as a basis for preserving open space and safeguarding agricultural land usage in areas relatively near to metropolitan centers. The land treatment could be integrated with other forms of local development to achieve multiple benefits and economies. For example, the increased crop production will require additional local agro-business support in the form of expanded

storage and drying facilities, and seed and equipment sales. Also, local farmers could develop feeder stock or finishing beef operations using locally grown feed and the land waste treatment facilities.

Satellite residential, recreational, commercial and industrial development could be easily integrated into a land-use plan using the land treatment system as a nucleus. Additionally, power sites could be co-located with the treatment facilities. The water in the storage lagoon could then serve as cooling water for the power plants, thus solving a major regional problem. The accruing revenues and increased tax base would further help stimulate the area's economy.

Current evaluations indicate that there would be no health hazard or damage to the cropping fields with proper management of a land system. Additionally, the potential odor problems can be controlled to avoid causing a social nuisance. Therefore, it appears that the land system can be incorporated into the agricultural area without disrupting the life-style of the area.

This concluded the Corps' presentation. The questions and concerns which were subsequently raised during the three work group sessions are summarized in the following sections.

SECTION II

Agricultural Work Group Meeting

Joliet, Illinois

8 January 1973

Agricultural Work Group Participants
8 January 1973 Meeting
Joliet, Illinois

Mr. George C. Bell
Building and Zoning Admin.
Kendall County

Mr. W. H. Brown, Jr.
Natural Resources Dept.
Illinois Agricultural Assn.

Mr. Phil Burgess
Div. Soil & Water Conservation

Mr. Clyde Burkhart
Grundy County
Soil & Water Conservation District

Mr. Robert J. Diefenbach
Kankakee Farm Bureau

Mr. Ivel H. Dumais
Soil Conservation Service

Mr. Lloyd D. Graham
Extension Service
University of Illinois

Mr. Hal Holz
Land Management
Wilmington, Ill.

Mr. John H. Jacobs
Extension Service
Kendall County

Mr. James C. Mann
Kendall County Board

Mr. Virgil Pagoulta
Kankakee County
Soil & Water Conservation District

Mr. R. Ben Peyton
Kankakee Audubon Society

Mr. Albert Pilch
Extension Service
University of Illinois

Mr. Harold J. Poeschl
Soil Conservation Service

Mr. Rollin
Kankakee County
Soil & Water Conservation District

Mr. Howard Shoger
Kendall County Board

Mr. Rollin M. Swanh
Soil Conservation Service

Mr. A. A. Wicklein
Extension Service
Will County

Mr. C. W. Zagers
Eastern Will County

Corps of Engineers Personnel

Major Leroy R. Hayden, Jr.
Mr. James M. Maas
Mr. Milo Ryan

Agricultural Work Group Meeting
Joliet, Illinois
8 January 1973

Comments and Discussion.*

GM: Will the area's cold climate slow the crop residue's decomposition under the no-tillage system?

A: No. The no-tillage method has been successfully used not only in the study area, but also in Nebraska and other plain states having equally severe cold weather.

GM: There is a concern about the disposal of the sludge. Past effects in Grundy County were unacceptable because of odor.

A: Odor results when the sludge has not been sufficiently treated and stabilized. Designs of all three technologies make provision for the sludge to be completely stabilized before being returned to the land. For example, the sludge from the advanced biological system is processed through an anaerobic digester to insure stabilization. Similarly, the sediment or sludge in the storage lagoon of the land treatment system is stabilized by the digestive action of the anaerobic microorganisms.

GM: The small farmer (250 acres) cannot afford to convert from 38" to 30" row spacing.

A: The conversion is not mandatory. The cropping practice described in the agricultural paper was for illustrative purposes only. It recognized the current trend to closer row spacing and the inherent advantage of the corn canopy for shading and thereby reducing weed growth.

GM: Will the wetness of irrigation cause fungus problems? Might not some new ones or other plant diseases occur?

A: We do not anticipate crop losses attributable to fungus, rot, or blight. First of all, the drainage system is designed to maintain the ground water table at 5-10 feet below the soil surface. Furthermore, the drainage system is also designed to keep the water table at or below a depth of 3 feet (root zone) except for no more than 2 days during any maximum rainstorm period in the area. We also believe that in the near future corn breeders will put a great deal more emphasis in the development of disease-resistant corn varieties which have even more favorable response to additional water and plant nutrients than those now available. However, the answer to this and other questions should be confirmed and this is why we recognize the need of further pilot studies - over and above others now under way.

*GM: Group Member
A: Answer

GM: How much rye is ruined during corn harvest?

A: None for all intents and purposes. The interseeding of the rye is phased to be done around the time corn matures. Thus, by the time the corn is harvested, the corn canopy has helped shade the rye and the rye growth is no more than 2-4" high, too low to be affected by combining operations, except what the combine wheels crush.

GM: Will the rye really grow to 10-12" under the corn canopy?

A: The estimate of growth was furnished by agricultural specialists. The high rate of nitrogen application was based on a forage rather than grain planting program and growth accelerated to obtain a rye heavily tillered (stooled) in the fall.

GM: The land site area in Kendall County coincides with the tier of townships that are presently subject to the greatest urbanized growth pressures. The population has increased 50 percent within the last 10 years.

A: An evaluation similar to the one undertaken to establish the prototype land-use model described in the agricultural paper is currently under way for the Kendall County site. Since one of the planning objectives used in the area layout is to avoid all communities and other types of developments, such locations will be deleted in final sitings.

Note: Since this meeting, the site location in Kendall County has been changed from the Northwest to the South-Central area to avoid the urban growth centers.

GM: How will areas adjacent to land sites treat their wastes?

A: While not the subject of this study, it should be very easy to integrate the treatment of the wasteloads from the adjacent local communities and rural areas into the land system. Since the cost would be incremental to that already required, local changes should be minimal in comparison.

GM: Will there be any damage to the drainage of the adjacent lands outside the irrigation areas?

A: The subsurface drainage can be designed to minimize or eliminate such type of impact but this is a factor that must be evaluated in the cost of the land alternative(s).

GM: Will the herbicides and pesticides used in either tillage program eventually get into the renovated water system? Would there need to be an increase in pesticide use?

A: The no-tillage method does involve the use of more chemicals than the conventional method. However, the chemicals manufactured for use with either tillage system must meet EPA standards and at the least the ones used in the illustrative examples are biodegradable by the soil's microorganisms. Moreover, at the time of chemical application, the amount of irrigation should be minimal and must be phased to avoid moving the chemicals below the critical weed and root zones.

GM: Unless options are made available to the farmer, any 50-year contract would be considered too long. The commitment should be open-ended to allow sale if change of mind occurs.

GM: The need for the county and local governments to agree to this type of use must be supported by proper zoning (agricultural usage). It is understood that the draft of the (Illinois) state land use plan recommends that the counties or regional planning entities do the job of land-use planning. Thus, the landowners and local governmental units must be involved in the critical decisions as to the terms of "rights" and their impact on tax base. The Soil and Water Conservation Districts are presently empowered to establish zoning laws by referendum.

GM: Installation of the irrigation and drainage system by the operating entity normally would increase the land's assessed value used for tax purposes. Some provision is needed to safeguard the farmer against this potentially excessive tax burden or otherwise the incentive for participation would be lost.

GM: Consideration may have to be given to buy land from those against participating and then selling the land back to those farmers who wish to farm within the proposed system.

GM: There needs to be more coordination and much more stress on both informing and educating the people concerning the land-use concept. This must involve pertinent agencies at the Federal, State, and local governmental levels. The Agricultural Cooperative Extension Service can provide valuable assistance in informing local farmers and governmental entities. In addition, such organization as County Planning Boards, County Farm Bureaus, and Chambers of Commerce should be contacted and involved. This educational process should continue even after the study is completed since this is an alternative that will warrant consideration throughout the area.

GM: There is a form of irrigation in progress now. In the area around St. Anne, Ill. potatoes and truck vegetables are grown in fields irrigated by water pumped through field drain tiles.

A: We recognize that some of the areas in the various land sites are already employing some form of irrigation - be it by subsurface (with drain tiles) or furrow (ditch) methods. This reinforces the concept that controlled-type irrigation is of value to the farmer in increasing yields. However, the type of crop grown is a problem, particularly the nitrogen uptake and the adaptability of cropping to irrigation.

SECTION III

Agricultural Work Group Meeting

DeMotte, Indiana

9 January 1973

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Agricultural Work Group Participants
9 January 1973 Meeting
DeMotte, Indiana

Mr. Norris E. Barnett
Cooperative Extension Service

Mr. Harry Beck

Mr. Otis J. Bedenkop
Indiana Farm Bureau, Inc.

Mr. Jacob Bonstra
Newton County Health Dept.

Mr. James Brentlinger
Cooperative Extension Service

Mr. Harold Budde
Vistron Corp.

Mr. Acord Cantwell
Dept. Natural Resources
Indiana Farm Bureau, Inc.

Mr. John M. Cervenka
Kankakee Valley Association

Mr. Dale Dawson
Newton County

Mr. John V. DeGraff
Kankakee Valley Assn.

Mr. John A. DeKock

Mr. Williman DeWitt
Stokely Van Camp

Mr.. Irvin Dorn

Mr. Harold Duttlinger
Jasper County
Soil & Water Conservation District

Mr. Roy Frieden

Mr. W. D. Grow
Grow Feedlots

Mr. David Grevenstuk
Grevenstuk Farm Service

Mr. Roy Kindig
Newton County
Soil & Water Conservation District

Mr. A. D. "Bud" Luers
Cooperative Extension Service

Mr. Harry Miller

Mr. Ernest Munster
William Gehring, Inc.

Mr. Lawrence Nelson
Pulaski County
Soil & Water Conservation District

Mr. Jack Nesbitt
Kankakee Valley Assn.

Mr. Charles Nief
East Walker Township

Mr. Edward Ramey
Jasper County
Soil & Water Conservation District

Mr. H. P. Reinhold
Cooperative Extension Service
Porter County

Mr. Dean Ruhl
Smith-Douglas & Grevenstuk
Farm Service

Mr. Don Schriefer
Advanced Agr. Service

Mr. Bob Schriner

Mr. Robert L. Sims
Vistron-Sohigro

Mr. H. Raymond Sinclair, Jr.
Soil Conservation Service
U. S. Dept. Agriculture

Mr. M. C. Sparr
Ind. F. B. Coop.

Mr. C. H. Spindler

Mr. A. J. Verplank
Lake County

Mr. Paul Wharton
Cooperative Extension Service
Lake County

Mr. Todd Wikle
Jasper County Health Dept.

Mr. Don E. Wilson
Kentand Bank

Mr. David L. Yeager
Cooperative Extension Service
Porter County

News Media

Mr. Tom Asher
Hoosier Farmer Magazine

Mr. Bob Becker
WRIN Radio

Mr. Thomas Gruber
South Bend Tribune

Rev. Geo. Kashmer
Porter County Herald

Mr. Gerald Kenning
Kankakee Valley Post News

Mr. Roland D. Nielsen
North Judson News

Mr. James Pounds
WCCL

Mr. Paul Rechlin
The Hammond Times

Mr. Garth Grow
Rensselaer Republican

Ms. Joan Whitaker
Profile Herald

Corps of Engineers Personnel

Colonel Richard M. Wells
Mr. James Maas
Mr. Milo Ryan

Agricultural Work Group Meeting
DeMotte, Indiana
9 January 1973

Comments and Discussion.

*GM: Is there any land system as described in the agricultural paper actually in operation or is it only "on paper"? What sort of back-up or proof is available?

A: No, there are no comparable systems in operation as yet. However, the Muskegon County, Michigan waste treatment system and EPA demonstration project, which is comparable, will begin irrigation in the spring of 1973. The Corps is also evaluating some of the larger of the 500 or more sites in the U.S. which use land for some form of waste treatment.

GM: Will there be an odor problem associated with the lagoons?

A: Generally speaking, no. However, there is a possibility during spring thaw when a turnover of the water layers may occur. Even so, the problem can be overcome by use of portable mechanical aerators for some 30 days after the air and water temperatures begin to rise, reflecting the change from winter to spring. The use of buffer zones and tree planting will also help.

GM: Is it correct to assume that this is not a formal committee?

A: Yes. This is a work group who, by providing input into the agricultural paper and related studies, will materially improve the Chicago District's study. Naturally all your views and concerns will be included in the minutes and be reflected in the report.

GM: Would the record show that a memorandum dated December 28, 1972 from Harry Galloway of the Cooperative Extension Service, Purdue University, is being offered for your information?

A: A copy (exhibit) will be included in the minutes.

Note: Subsequent review of the memorandum indicates that it is a condensation of Mr. Galloway's letter of 18 December 1972 previously sent the District Office. In that letter Mr. Galloway itemized a number of basic questions and concerns regarding the agricultural paper. Responsive comments and answers were furnished by letter dated 5 January 1973 for Mr. Galloway's further consideration.

GM: The ability to produce the projected corn yields under the 4-6 inch weekly application rates is questioned. The drainage system would collect high concentrations of nitrates at the climax of the biotic

*GM: Group Member
A: Answer

cycle of fresh organic matter decomposition from each year's crop residue. These nitrates are normally held near the soil surface by the upward movement of evaporating water. They are pushed downward to the corn roots by periodic rainfall. Irrigation at the proposed rates would definitely carry leachable nitrates out of the root zone.

A: The rates of application will vary over the 8-month period in accordance with the crop demand and holding capability of the various nitrogen control mechanisms. The nitrogen requirements for both the corn and the rye was based on feasible planting budgets. The variable, time-phased nitrogen uptake of the corn (see Figure 8, Page 30 of agricultural paper) and the rye provide the basis for varying the application rates during the growing season. The fact that the nitrogen uptake by the two crops varies over time requires phasing application in relation to the banking capacity of the soil's micro-organisms as well as crop uptake. As with commercial fertilizer application, the nitrogen of the treated wastewater is "banked (or tied-up)" in the bodies of the soil's microorganisms which convert the plant residues to humus and other forms. Thus, the nitrogen is temporarily retained at the surface or within the plow zone, depending upon the form of tillage used. Only when the carbon-nitrogen ratio of the crop residue is reduced sufficiently is there any release of the nitrogen; and then at initially low but increasing rates. However, the banked nitrogen is not sufficient to provide the total nitrogen budget and over time must be supplemented by additional application. Thus, the same nitrogen balance and holding mechanisms employed with commercial fertilizers are used by the irrigation system. The significant difference is that the time-phased application of the irrigation system actually provides protection against the problem of ground water leaching experienced when the nitrogen is applied in one concentrated application as is done with commercial application of inorganic fertilizers.

GM: If present treatment systems do not meet the new standards, there are still other methods for disposing of such water. Why not locate larger and deeper wells near the source of secondary treated water supplies.

A: The purpose of the land system as well as the advanced biological or physical-chemical plants processes is to provide a significant level of purification over and above (current) treatment. The function of wells in the land system is to maintain the drainage system and to collect the renovated water for return to the C-SELM area. The water must be returned for reuse and <u>not</u> disposed of outside of the drainage basin where it originated.

GM: If recycling is the accepted practice of waste disposal, why not dispose of the minerals and heavy metals which are so objectionable by either burying them deep in the earth or send them back into the sea? The proposed recycling system does not attempt to put them back in any reasonable proportion of land area.

A: The minerals and heavy metals are part of the total constituents discharged into our sewer systems and come from both municipal and industrial wastes. By disposing the objectionable wastes without treatment would not be responsive to the overall goal of cleaning up our environment.

GM: The proposed application rates will require weekly fungicide treatment for protection against smut, leaf blight, stalk and root rots. This is the present practice used in sweet corn production in southern parts of Florida with high moisture regimes.

A: From the information we have collected, corn losses from smut are greatest when corn suffers from a moisture deficiency rather than during wet growing seasons. Thus, smut losses are likely to be decreased under the proposed irrigation system. Most corn varieties now have good resistance to the disease and yield losses (which are accounted for in determining the harvestable yield) attributable to smut are less than 2 percent of the total. The drainage system is designed to not only maintain the upper five foot zone in an unsatured, aerated condition, but also insures that the water table does not approach the surface to a depth of less than 3 feet for a period of greater than 48 hours during any maximum (on-site) rainfall period. This should protect against root rot. Your suggestion concerning the need for fungicide to protect against leaf blights and stalk rot, however, will be investigated.

GM: Short season corn varieties planted early with high populations, excessive moisture, and adequate plant food do not perform as longer season varieties do. They grow taller, contain low-sugar content, become more disease susceptible, and do not physiologically mature in their usual time span. They certainly cannot be expected to produce 200 bu/acre in seasons of low heat unit accumulation. Proposed irrigation and increased moisture evaporation will further reduce heat unit accumulation.

A: The transpiration expected to be experienced on-site is not anticipated to have any significant cooling effect in what is already a humid area. We will, however, seek additional data on this point. The calendarization for the system under either tillage method recognizes the same planting and emergence dates used in the area now. The time frame for physiological maturity is based on a historical trace of growing-degree days required for the recommended variety and typical of the land sites. It is significant to note that we have differentiated between a planting budget (and costs) for 200 bushel corn and a harvestable yield of 165 bushels.

GM: Presently known herbicides will not perform satisfactorily with constant application rates of 4-6 inches per week. One inch per acre soon after application is ideal. Three inches per acre during the first three weeks is maximum for full results of most presently used chemicals. Six inches of water per acre for 3 weeks in succession would obliterate 90 percent of our present herbicides' effectiveness.

A: This is a pertinent point and must, of course, be integrated into our concern for varying the application rates in relation to the nitrogen demand. We have a restriction on application for about the first 30 to 40 days after emergence due to the small amount of nitrogen required for uptake by the corn. Since the herbicides and insecticides are applied at planting time, the effectiveness of the chemicals should be automatically safeguarded. However, we will pursue this matter further.

GM: While the percentage factors may be correct under current field conditions, the evaporation losses of water and volatilization losses of nitrogen are much too high for the changed regimen of applying 134 inches of water during an 8-month period.

A: The projected 30 percent loss of nitrogen under system operations by denitrification processes and ammonia evaporation from the soil surface is based on recent reports on research results, some of which were presented at the 1972 American Society of Agronomy Meeting in Miami. This point in particular was discussed with and verified by acknowledged experts in this field from the Agriculture Research Service of the U. S. Department of Agriculture.

GM: Based on the wastewater's constituent make-up and concentrations, some 21 pounds of boron per acre would be applied each year. If accumulated in the soil as indicated, it could become a source of boron toxicity and be detrimental to the cover crops. Actually the boron will not be retained by the soil and some will pass through. When this happens what will be its impact on the treated water's reuse potential, particularly for water supply?

A: System design must recognize the concern for boron build-up and possible toxicity effects to crops. Some of the boron will pass through the soil column and the resultant land treatment effluent which shows the renovated water to have 0 mg/l concentration will be changed. The degree of build-up, however, may well be controlled by the rate of application. We will have to assess the impact potential on both the cropping program and water reuse. To do this we will check the results being experienced at the Lubbock, Texas operations.

GM: In order to maintain the 5-foot well-aerated root zone, it will be necessary to lower the present water table over much of the proposed land site. What is the program's purpose -- waste disposal or taking clean water from our present resources? What will be the effect upon our water supply taken from shallow wells?

A: The drawdown is affected only under the irrigated fields to insure not only the successful growth of the cover crops but to collect the renovated water for return to the C-SELM area. Naturally the integrity

of the individual farmer's well will have to be protected. This can be done by controlling the siting of the irrigation system and maintaining suitable ground water tables through proper subsurface hydraulic design of the drainage system. This type of design control is being achieved at the Muskegon Michigan project where the ground water table was essentially at or near the surface.

GM: What will be the net water put into our soils? Will you be taking more water from our soils during wet periods and sending more water during dry periods?

A: The amount of water to be treated will vary over the next 50 years, reflecting the projected municipal and industrial growth for the C-SELM area. For any particular site, however, the volume to be treated will be a constant and controlled by the combined cropping practices adopted in the area. The occurrence of either a wet or dry year will affect only the operating times of the irrigation system and the application rates. We are planning to test the system's capability by analyzing the operational aspects during some of the wettest years of record. The calendarization given in the agricultural paper will be the basis for time-framing the analysis. The volume of water, equivalent to the rainfall less natural evaporation experienced in the land site area, can be either retained on-site for local use or returned to the C-SELM area -- depending upon the desires of the agricultural community.

GM: Reasonably well monitored tests in Georgia showed zinc levels in Bermuda grass reached 340 ppm after only two years of liquid sewage sludge disposal. Where should we project this level might be in only 10 years?

A: The design parameters for sludge management are based on University of Illinois research. The sludge used in the research program came from two plants in the Metropolitan Sanitary District of Greater Chicago that treat wastes from highly industrialized areas. The results of the research program, now in its 5th year and still continuing, has shown that the concentration level of any one element, including zinc, was not sufficiently high to warrant the Food and Drug Administration to consider animal-feeding experiments. Some of the test plots in this study involved plainfield sands, similar to sands in this area. Ground water samples indicate that no leaching of heavy metals has occurred. Moreover, we have the analytical results of heavy metal accumulations collected from the sewage farm in Melbourne, Australia. They have applied sizeable concentrations of heavy metals for many years (70 plus years in some areas) as a constituent of their sewage and the cattle raised and sold for export have shown no indications of any heavy metal problems.

GM: Why do you anticipate an average harvest loss of 35 bushels of corn per acre?

A: To differentiate between the planting program and harvestable yield and be conservative in evaluating the economic gain that the participating farmer could expect. The 35 bu/ac represents a 17.5% loss which some feel is too high; that a 11-13% field loss would be more accurate. Field loss experienced during combining could range from the normal 2% to a high of 5%; losses attributable to the growth of barren stock because of cooler soil temperature (no-tillage), high population and other related factors could range from 4 to 8% as a maximum; the balance of 4 to 11% represents a contingency factor for other types of losses not anticipated at this time.

GM: Farmers should not be asked to participate in such a project without a guarantee that their annual net income match their average earnings over the immediate past five-year period.

A: The question of income protection has to be recognized as a valid concern of the farmer who is willing to participate. Some form of indemnification must be provided by the operating entity to cover losses in income attributable to the system. This would have to be included in the contractural agreement reached between the farmer and the operating entity. This issue will be discussed in the report, along with other institutional considerations.

GM: Has the cost for drainage and pumping the (C-SELM) wastewater to and from the land site been determined?

A: Yes. The cost has been determined as part of the evaluation presented during the September 1972 public meeting on the 11 alternatives then under study. This cost is now being reevaluated because of the revised planning criteria used in current design and site layout as set forth in the agricultural paper. It might be of interest to note that the land system requires the most electrical energy of all three technologies, because of this specific pumping requirement.

GM: Could the industrial waste loads be collected and treated separately from those of the (C-SELM) municipalities?

A: Yes, in theory; but in many cases, industrial wastes are already being discharged into municipal systems. In reality, economics will probably govern. We are recognizing the need to apply specifications to the collector and conveyance systems in order to control what is received for treatment. From an economic standpoint, it makes more sense to treat wastes containing critical concentrations of pollutant constituents at the source where less volume is involved. Towards this end we are working closely with the Steel and Petroleum industries, the major industrial water users. We are seeking to ascertain what process modifications (including water use) could be expected under the new standards. In this way, the industrial waste loads can be controlled and the decisions made for costing either at-source or on-site treatments.

GM: Do the sandy soils have sufficient cation exchange capacity to achieve the desired level of fixation? What will happen to the soil's pH? What about the potential of calcium build-up in the soil solution?

A: Test samples, though of necessity limited in number, have been taken from the various soil groups in the site areas. Our calculations indicate that sufficient iron, aluminum and clays exist within the soil column to provide the necessary fixation mechanisms for the 50-year economic life of the project. To insure maintenance of proper soil pH, the cost for adding such soil amendments as dolomitic limestone has been included and footnoted in the required production cost budget presented in the agricultural paper. There should be little or no effective build-up of calcium in the soil. Bicarbonated calcium salts will pass through the soil column for all practical purposes, and be removed by the drainage system.

GM: What was the basis for establishing the amount of nitrogen required for corn production?

A: It was based on using 1-1/4 to 1-1/2 pounds of nitrogen per bushel per acre to determine the planting budget required for the total crop. Under steady-state conditions, not all is provided by the wastewater; only the amount harvested from the soil's biosystem. The remainder is recycled from the decomposed crop residue.

GM: Would the feed (corn) grain be of comparable low quality because of the high nitrate uptake?

A: No. As long as an aerated, unsaturated subsoil (root) environment is maintained by the drainage system, the plant should be healthy. Excessive nitrates shouldn't occur, for a healthy corn pretty well regulates its own constituent uptake as was demonstrated by the University of Illinois sludge experiments. Nitrate accumulation in crop plants at concentrations which might adversely affect animals have generally been associated with drought conditions which result in a severe deficiency of available soil moisture. Moreover, nitrogen application will be closely monitored during operations.

GM: Couldn't excess water cause less, not more yield?

A: No, not under the controls imposed on the design of the drainage system. The drainage must provide sufficient capacity to prevent the ground water from rising within 3 feet of the soil surface for more than 48 hours. This means that the root system is protected and lodging problems usually associated with high moisture content are avoided.

GM: Pilot studies should be instituted before farmers and the agricultural communities are asked to adopt and participate in the land treatment system.

A: Agreed. The need for pilot studies applies to all three technologies. While the theory and basic design criteria is sufficient for planning purposes, pilot studies are needed to obtain operational and engineering details for final system design - for whatever technological process is eventually selected for implementation. The Muskegon County, Michigan waste treatment system and demonstration project hopefully will provide data to help answer many of the questions raised. Also the Corps is presently evaluating some of the larger sites in the U. S. using land for waste treatment. Other research studies are under way to gain additional information on the land system. Several military reservations are considering installing land treatment systems to treat all or part of their wastes. Thus, we should have a considerable quantity of data on the land treatment system before any of these systems being planned could be implemented.

GM: While the Corps claims no preference, there seems to be a major emphasis on and support for the land treatment system. Is this true?

A: No. There is no preference one way or the other. The Chicago District's assignment is to identify alternatives feasible of achieving the national water quality goal of eliminating pollutant discharges on a regional basis. The different technologies are being employed as methods for achieving this goal. We propose to evaluate and present, in report form, all of the implications involved in each alternative--including resource consumption, social and environmental effect, costs, water reuse potential and institutional considerations. No recommendations concerning any of the alternatives will be made. Hopefully those that have the decision-making responsibility will find the report of assistance in their own evaluation. The time and emphasis expended on the land system is the result of the public concern and questions raised about the technology. Using land to treat wastewater is something new in concept to the general public and is not readily associated with the advanced biological or physical-chemical processes.

GM: How does the constituent listing for the secondary treatment effluent from the storage lagoon compare to what could be expected from the C-SELM area?

A: It is based on an original list prepared by the University of Washington and the Corps Cold Regions Research and Engineering Laboratory ascribing the constituent loading which could be obtained from a typical secondary treatment plant. It was then modified to reflect present loadings from the Chicago MSD and Gary plants, industrial projections obtained from the major water users in the area, and the dilution and loading factors attributable to the expected storm water runoff. As such, the constituent levels listed in the paper should closely approximate what is to be generated in the C-SELM area.

GM: I wish to offer two articles for your consideration. The first is entitled "Putting Waste In It's Place" and was prepared by Dr. Howard A. Tanner of Michigan State University. It deals with the

Michigan State University's Water Quality Management Project which will be similar to your land treatment system in that wastewaters from the university will be spray-irrigated on land. They have raised many questions which they plan to research. The second article was prepared by the University of Pennsylvania College of Agriculture. Part of the article deals with their work in wastewater management by the land system and some of their findings and concerns.

Note: The two articles are quite lengthy and have not been reproduced. They are being held on file in the Chicago District where they can be reviewed.

A: Thank you. We are familiar with the work being done at the University of Pennsylvania and have published data from their research project.

GM: Will the chlorine residual prove harmful to the crop?

A: The chlorine is primarily dissipated to safe levels in two ways. It is first dissipated in terms of holding time since chlorine is comparatively short lived and will be materially reduced in concentration level by the time it reaches the irrigation rig. Once it passes through the spray bar and nozzle and is sprayed, any free chlorine will be volitalized. Thus little or no trace of chlorine should be found in the soil.

GM: The schedule of field operations is unrealistic. First of all the equipment and labor assumed for the 900 acre farm is too high: Secondly some of the key dates, particularly maturity and harvesting, are not what we experience. Have you made allowances for bad weather, rainfall and other factors?

A: The two schedules have been prepared to reflect and be workable with lesser labor and equipment capability. All of the field dates were based on the objective of having the corn planting completed by 10 May. This was a target date recommended by all of the farmers and Extension Service Agents who assisted us in the preparation of the paper. Then starting from corn emergence, the dates for maturity were based on the use of growing-degree days. Since early maturing hybrids are being used, the maturity and harvesting time-ranges differ from the longer-season-varieties many of you now plant. Allowances have been included for bad weather and equipment down time. However, we are going to evaluate the field operations against a range of wet years to insure that we will have sufficient time and capability for treatment.

GM: Since corn and rye are members of the grass family, they could be subject to the same types of soil insects and disease-producing fungi. Wouldn't it be better to drop, say rye, and go to a rotational cropping system? Naturally the amount of water applied would have to be reduced.

A: The theory of rotational cropping patterns was originally designed for insect and crop disease control; but the seed and chemical industries have solved most of the crop disease and insect problems. Today many farmers are growing corn on a continuous basis with no problems. In Kentucky and elsewhere the no-tillage system of continuous corn and rye has been very successfully implemented.

GM: Will the excessive irrigation required for treatment destroy the effectiveness of the insecticides and herbicides required for either tillage system? Is there any danger of these chemicals leaching into the soil column and adversely affecting reuse of the treated water?

A: No. The concern for time-phasing application of nitrogen to the soil's control mechanisms and crop uptake should pretty well complement the need to safeguard the effectiveness of the insecticides and residual herbicides. The contact herbicide is no problem. This will have to be further evaluated along with other factors in verifying an operational application schedule.

GM: What types of herbicides and insecticides are to be used? Some used in the past have proved hazardous to human health and have been banned.

A: The type of herbicides and insecticides to be used are those presently on the market and approved by the U. S. Environmental Protection Agency. We have not cited specific trade names which were used in evaluating and costing the system so as to avoid being put in the position of seemingly to favor a particular brand. Such herbicides as paraquat and atrazine lasso and insecticide such as heptachlor or dieldrin could be used.

GM: What provision would be made if the plant uptake mechanism is destroyed, for example, by hail or windstorm?

A: (Delayed Answer) If the corn crop would be damaged significantly, a grass cover crop would be quickly air seeded and cultivated. Depending upon its growth stage, the corn might have to be harvested (silage) to insure effective nitrogen removal and/or plowed under to maintain subsequent nitrogen immobilization with the crop residue.

GM: How suitable is rye as a feed crop with its high water content? Wouldn't the cost of harvesting the rye be greater than its market value? Would the water content of the rye impact on our drying (fuel) situation?

A: If the rye would be too wet, the water volume (in the stomach) would actually reduce the solids the cattle could consume and so adversely affect growth. Either drying or mixing the rye with hay or other dry fodder then would be required. If the cost for harvesting the

rye exceeds the then market price, either the increased cost would have to be reimbursed by the operating entity or less nitrogen applied per acre and the rye retained only as a protective cover and mulch crop (its original design function). The impact of possibly having to dry the rye and what impact this could have on the current energy (gas) market has not been assessed as yet. This will have to be determined.

GM: The mineralization of the sands in this area has caused problems in the subsurface drainage systems and well points. A crusting (iron etc.) occurs and within 3-5 years the buildup actually seals the drains or well points so that they are rendered inoperative. Are you aware of this condition and its probable impact on your drainage system?

A: We were not aware of this as a possible problem and will have to have our engineer consultant assess its impact on the system's design and operation.

GM: The Kankakee Valley Association would like to meet with the Corps consultants who are to assess the social-environmental impact of the alternatives. This will permit the Association to better present the viewpoints of the agricultural community.

A: We will be happy to provide the opportunity. Arrangements will be made to schedule a meeting with our evaluators.

Note: To insure that viewpoints are incorporated not only in the referenced evaluation but also in the report, the Kankakee Valley Association has been requested to provide their viewpoints in written form as well.

GM: The agricultural paper mentions that there are over 500 municipalities in the U. S. that use some form of land treatment. May we (Kankakee Valley Association) obtain a copy of this list?

A: Yes. A copy will be furnished your organization.

Note: A copy was subsequently mailed.

GM: The 134 inches of water per acre just seems too much. Why not take 1/4 of this amount on a per-acre basis and use the higher land requirements as the basis for designing and costing the land system? That would be more realistic.

A: The amount of water applied is just one of the factors that has to be evaluated. The basic objective of the land system is to provide the equivalent of advanced treatment and as such we are obligated to maintain a practical balance between the associated costs and social implications. The redesign set forth in the agricultural paper has already increased the cost of the land system by some 20 percent - almost all directly to minimize any potential adverse effects on the environment and life-style of the agricultural community.

GM: Are you going to consider providing the participating farmer some form of protection against crop failure and a possible downgrading of land value?

A: Yes. We are now just in the process of addressing this concern. It is reasonable to expect that the farmer would have to be given some form of income protection against losses directly attributable to the system design and operation. Similarly the potential in land value changes will be evaluated.

GM: What are the characteristics and constituent levels of the wastewater to be treated at the Muskegon Michigan project?

A: We do not have that type of information available. To find out it might be well to contact either the County itself or perhaps the Regional Office of the U. S. Environmental Protection Agency in Chicago.

SECTION IV

Agricultural Work Group Meeting

Crystal Lake, Illinois

10 January 1973

Agricultural Work Group Participants
10 January 1973
Crystal Lake, Illinois

Mr. Don Barrett
Agriculture Dept.
McHenry County College

Mr. Henry Boi
Farm Bureau

Mr. Phil Burgess
Soil Conservation Service
Ill. Dept. Agriculture

Mr. Kenneth V. Fiske
McHenry Co. Conservation Dist.

Mr. R. A. Fleck
Soil & Water Conservation District
McHenry County

Mr. Conrad F. Flocter
McHenry County Board

Mr. John D. Gorby
Office of the States Attorney

Mr. Lynn Hadlock
McHenry County Board

Mr. J. V. Johnson
McHenry Co. Dept. of Health

Mr. William A. Kelly
Kell & Conerty

Mr. Charles Kirkpatrick
Aillview Farms

Mrs. R. Kurtz

Mr. Kelly McClain
McHenry County Regional
Planning Commission

Ms. Judith Macdonald
League of Women Voters of
Crystal Lake

Mr. Henry Marlowe
Owxier Marlowe Feed & Hatchery

Mr. John R. Quay
McHenry Co. Planning Commission

Mr. Robert D. Walker
University of Illinois

Mr. Charles Weingart

Mr. Richard A. Wissell
McHenry Co. Dept. of Health

News Media

Ms. Iris W. Bryan
Woodstock Daily Sentinel

Ms. Marian Gallery
Elgin Daily Courier News

Mr. James C. Thomson
Prairie Farmer

Corps of Engineers Personnel

Colonel Richard M. Wells
Mr. James M. Maas
Mr. Milo Ryan

Agricultural Work Group Meeting
Crystal Lake, Illinois
10 January 1973

*GM: Would the residual herbicide adversely affect the rye growth?

A: Not according to our present information. The schedule dates for application of the residual herbicide and the rye interseeding were based on current no-tillage operations involving double cropping of corn and rye. The time range cited for interseeding reflects this concern (among others) in particular.

GM: Were the waste loads generated in McHenry County included in the land site(s) design?

A: No, though such waste load could be easily incorporated during later design studies, should such a system be selected for implementation. The authority for the study was limited to the watershed of the C-SELM area and did not include the Fox River Basin.

GM: How would this be politically implemented?

A: This decision would be the responsibility of the local governments working in cooperation with both the State and Federal Environmental Protection Agencies. It certainly will be a major factor in selecting and implementing any area-wide plan which must be approved by the U. S. Environmental Protection Agency if application for Federal grant monies is to be made after 30 June 1974. The report will not only identify the main institutional problems associated with each of the five alternatives, but also present various institutional arrangements which could be considered, should any of the alternatives ever be implemented.

GM: Is the water treated by the land system returned to the C-SELM area?

A: Yes. However, should there be a need for water supply in the land site areas, suitable arrangements would have to be made between the appropriate governmental entities. The State, most likely, would be involved too, because an interbasin transfer would be involved.

GM: How is the drainage system designed to assure the system's effectiveness as well as control of nitrogen removal?

A: The design of the drainage system is based on both the infiltration rate of the surface soil layer and the percolation rate of the subsoil. Using these factors, the spacing and depth of the drainage lines are then computed to maintain an aerated, unsaturated zone at least 5-foot in depth. A temporary buildup of water within three feet of the surface will be allowed, but not to exceed more than 48 hours. This type of constraint will protect the root zone of the crops. Furthermore,

*GM: Group Member
A: Answer

this criteria is applied not only for the irrigated effluent but also for the rainfall experienced in the area. Control of nitrogen removal will be achieved by varying the rate of application of the treated wastewater. The rates will be adjusted to effectively utilize the banking capacity of the soil microorganisms, plant uptake and volitization over and above the residual level permitted in the renovated water. The microorganisms, using the crop residue as a source of energy will effectively bank the applied nitrogen in the wastewater. Subsequently, the nitrogen will be released slowly as the carbon-nitrogen rate of the crop residue is reduced, and will be taken up by the crop in its early stages of growth. Only after the nitrogen demand of the corn exceeds the banked capacity is the wastewater applied at the higher rates. The actual phasing will reflect the uptake needs of the rye and the corn; the latter actually shown in the agricultural paper.

GM: Will the farmer still own the land under the system described in the agricultural paper?

A: Yes. For those lands to be irrigated the farmer will retain ownership, though a long-term contractual arrangement will be required. This arrangement would require the farmer to agree to accept a certain amount of treated wastewater within a specific time framework and to grow and manage those crops suitable to the system's needs. However, the lands required for the aeration and storage lagoons and the buffer areas would be acquired in fee, i.e., outright purchase by the operating entity, whoever that may be.

GM: Will the industrial wastes brought into the lagoons with the sewage kill the bacteria in the soil that are needed to help renovate the wastewater?

A: No, it should not, based on current sanitary plant operations which treat some industrial wastes, but your concern is well taken. As is being done in some areas with just conventional biological treatment plants, control will have to be exercised over the type of waste load which can be discharged into the collector system. The dilution effect of the storm water runoff will be a safety factor to help safeguard against any unknown toxic loads that might inadvertently be discharged into the system.

GM: Will some means of protecting the income of those farmers participating in the land system be provided?

A: Yes. Provisions will have to be made to indemnify the farmer against loss in income when those losses are the result of the system's operations. Furthermore, we are in the process of assessing how to offset the long-term appreciation in land value that would be foregone if the land-use was restricted to agriculture and not available for other competitive demands.

GM: Will the drawdown by the drainage system under the irrigated lands affect the water table in the surrounding area?

A: For all intents and purposes - no. The drainage system will be designed to maintain an inward flow gradient only to the extent that control and capture of the treated water is assured. The area of influence will be extended beyond the irrigation rigs but be basically within the land areas owned by the participating farmer. Where it extends beyond, due compensation will have to be made.

GM: Are the requirements for the portion of the land system in McHenry County known at this time?

A: No. The final requirements will not be developed until the prototype land-use model for this county is completed and the results extrapolated to the allocated loading from the C-SELM area.

GM: Is the land system still the cheapest alternative?

A: The relative cost advantage has been appreciably changed from what it was during earlier comparative analyses. The changes in design attributable to minimizing any adverse social and environmental effects have resulted in at least a 20% increase in costs for the land system. What the final differential will be cannot be determined until the design is completed.

GM: How is the (local) county growth being recognized in the study?

A: The prototype models are being developed to reflect overall growth and land-use patterns in the land site areas. This is then reflected in the effective land-use ratio and serves as the basis for locating the 1990 and 2020 lands. The waste loads of the McHenry area, however, are not included in the design and costing of the proposed system, though they could be ultimately integrated in later design stage if so desired.

GM: Will the system be able to prevent any adverse buildup of heavy metals in the soil?

A: Yes. A monitoring program will be required as part of the system operation and controls. The monitoring program will be designed to detect potential trends in any constituent buildup or treatment capability within the soil column. In all probability the waste loads from both industrial and municipal sources will be monitored as will the renovated water before being returned to the C-SELM area. Moreover, the soil must be sampled and tested over time to provide supplemental data. In this way proper steps can be taken early enough to prevent any type of buildup or other concern from becoming a problem. The work done by the University of Illinois concerning the use of sludge for growing crops indicates that the application of the treated wastewater should not result in any adverse buildup of heavy metals. Since the comparative concentration of heavy metals in the wastewater is quite small, no adverse effect on the cover crops is anticipated.

GM: How will the farmer's income be protected during the time the distribution, irrigation, and drainage systems are being installed?

A: Some type of indemnification, probably in the form of supplemental payments, may be required during the period of installation and first few years of operations. Certainly the farmer cannot be expected to suffer any loss in income during this initial start-up period. Cost equivalents for this type of loss will be included in the final design and system cost.

GM: Would the participating farmer be able to sell his land if the buyer agrees to farm within the system requirements?

A: Yes. Ownership is retained by the participating farmer.

GM: What if the new owner would want to adopt a different land-use and not farming?

A: Under this situation, the answer would be no. The long-term contractural arrangements between the farmer and operating entity would continue in effect and be transferrable as a controlling rider to the land title during the 50-year period.

GM: Could there be any problems from air or waterborne disease?

A: Not that we can foresee. Remember that the wastewater is given primary and secondary treatment and then chlorinated before being transported to the fields and applied to the land. This is the equivalent treatment standards for the present-day plants and there are no health problems experienced by workers in these plants. Finally the extremely small percent of the pathogens and viruses that remain after chlorination are filtered out by the soil and then degraded by the soil microorganisms.

GM: Could nursery or orchard-related products be grown rather than the corn and rye.

A: Yes, but the rate of application would be reduced to reflect a lesser nitrogen uptake. More land would be required under this alternative cropping pattern. Whether for commercial or recreational purposes, any form of reforestation could be integrated into the system if desired by the county and acceptable to the land owner.

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Lafayette, Indiana 47907

December 18, 1972

Mr. James Maas, Chief
Planning Division
U.S. Army Engineer District, Chicago
219 S. Dearborn St.
Chicago, Illinois 60604

Dear Mr. Maas:

Thank you for respecting the request of Purdue University to again examine your compilation titled "The use of land as a method of treating wastewater (its meaning to the agricultural community)". An earlier draft was examined by sixteen interested Purdue staff members in Agriculture on November 22 and 24. It was then reviewed verbally with you and Mr. Hessel on November 27 in Chicago, by Drs. Rolland Wheaton and Jerry Mannering and by myself in company with a similar group of University of Illinois staff members. Mr. Ray Sinclair, SCS State Soil Scientist from Indianapolis and Mr. Joe Berta of the Illinois Department of Agriculture at Springfield also participated. We know that you then took this revised draft to Washington for consideration by officials in the U.S. Dept. of Agriculture. Since the present draft is an advancement over the first we appreciate the opportunity to study it once again.

We want to compliment you on pulling together a large amount of technical detail to illustrate how land can act to clean pollutants from wastewaters. We recognize that this was compiled partly from the literature including text books and partly from consultation with engineers, agricultural scientists, and to some extent from the experiences of land treatment systems managers. It is necessary to bring many facts and theories into context in order to study a possible system and think through its workability. If we were to wish to go to practicing farmers with programs, to help them understand how land could help treat wastewater and still grow crops efficiently, this step is essential. We understand that a major objective in preparing this compilation is to have it form a basis for discussion of using land to treat wastewaters and we try here to make an objective evaluation with this in mind.

Since land spreading could, conceivably, be under consideration for use someday in Indiana and Illinois, our comments will probably reflect a more critical appraisal than would comments from persons outside these two states. In matters pertaining to agriculture, Purdue University's School of Agriculture will be held strictly accountable by Indiana citizens for making as objective and thorough a study of the potential of important land use proposals such as land spreading well before such would be proposed for adoption in the state.

During our November 27 review it seemed clear to us that there were a number of major concerns felt by the entire group which we discussed rather thoroughly and we will discuss them once again in the following pages.

--The basic reason behind land treatment of waste water was one concern. It seems to us that the objective is to reclaim water to useful form and not to raise farm income as the paper seems to imply. If a harmony could be achieved between the man, the land, the extra water and the crops so that a level of income could be maintained equal to that today this might be an acceptable goal!

--The general tone of optimism common to the paper was another concern. It seems to aim at selling rather than informing or teaching! Combinations of practices including no-plow tillage are suggested toward a system using corn and a rye inter-crop in order to maximize use of nitrogen and phosphorus and lengthen the possible application season for treated waste-water.

Adding rye introduces a seeding, management and harvesting expense for farmers and provides necessity for a spring-time kill of growing rye by relatively expensive contact herbicides. The harvested rye would be a crop which must be ensiled for use or otherwise disposed of. This may be more of a negative than positive factor to farmers.

Introducing no-plow tillage and leaving a mulch on the surface will delay warming of the soil and slow early corn growth. Pinney-Purdue Agrl. Center climatological data near Wanatah indicates that under sod temperatures are up to 8°F lower than under bare ground in April and up to 5°F lower in May. Similar trends have been observed during our long-time tillage studies there.

No-plow tillage without cultivation also introduces new weed management problems and makes the farming system much more herbicide dependent. We are glad that you have recognized this in the revised draft and have also calculated costs based on a conventional tillage system for corn and rye.

The need for an early maturing hybrid, to allow early harvest, fast rye growth and a late fall irrigation cycle, will mean a sacrifice in potential corn yields of some 10-15 percent. In 4 years of high fertility corn hybrid tests on northern sandy loams at two locations without irrigation, long season hybrids (125± 10 day physiolgic maturity at 28-36% moisture depending on hybrid) averaged 130-135 bushel per A. corrected to 15.5% moisture. Mid-season varieties, the earliest entered in these tests, averaged 112-117 bushels per A. These would be mature in 115± 10 days. Short season varieties would have even lower potential.

Planting thicker populations than commonly used would not raise potentials appreciably since earlier hybrids often lack the stalk strength available in later hybrids. This could cause severe harvest problems and lodging tendency would be expected to increase under high moisture and nitrogen conditions.

The need for early corn harvest will mean that grain is harvested at moisture content above that at normal harvest period and will surely not lower the expenses in fuel costs and handling as stated in the paper.

--The assumed value of water to provide a controlled no-risk climate for crops was another concern. It is assumed that irrigation could overcome yield potential losses of early season hybrids and boost corn production by some 20 percent over today's average 135 bushel level. Since averages are based on use of mid and full season varieties this does not seem reasonable!

In the Kankakee valley the soil and climatic pattern are such that severe drought is infrequent except on the driest sands. Such dry sands comprise only about 20 percent of all soils and only a small part of these sands are cultivated due to low productivity, difficulty in managment, and danger of wind erosion. Most are in oak woodland and pasture. An additional 5 percent of well drained lands are less droughty and less responsive to irrigation. The dominant flat black and gray poorly and somewhat poorly drained sands and sandy loams are not normally droughty and would have low response to irrigation for field crops like corn.

A number of farmers who practiced irrigation in the late 50's and early 60's no longer do so and it can be assumed that extra production costs did not equal the gains at prevailing corn prices. Many farmers achieve a desirable water table relation for crop growth by controlling water levels in drainage ditches by installing check dams and by pumping from wells to the ditches during the summer. This has been a relatively cheap way to exert control over water sufficient to produce crop yields close to those achieved by farmers on flat soils of higher water-holding capacity outside the valley.

While some crop gains could be expected from extra water applied on occasional dry years it is reasonable that some losses may be expected on the more frequent normal and wet years. There are several reasons this might be true.

1. When corn is in the 8-10 leaf "knee high" state (mid to late June) the development of the ovules which determine later grain formation is occurring in the growing point in the lower stalk. Wet soil conditions in this period have been shown to lower ovule production and the opportunity for later pollination and grain filling.

2. Corn smut increases radically in cloudy, wet seasons when there is little opportunity for drying of the whorl at the time the corn tassel is nearly ready to emerge (early to mid-July). Spores are always present and when they wash into the whorl from upper leaves (rainfall or irrigation) and the whorl remains wet they develop rapidly and infest the developing tassel with smut as this emerges and may later infest the ear.

3. High moisture, high nitrogen conditions as discussed earlier makes the potential of yield increase by higher population density less likely and the chance for lodging and harvest problems more likely. As earlier hybrids are introduced which characteristically do not have the stalk strength of later hybrids they tend to be thin and spindly when planted thickly.

These three potential losses illustrate the delicate balance in which a biologic organism like corn exists with its environment. Yield and production can vary considerably according to climatic fluctuations not all related to drought. How crops would perform under an environment which eliminates drought but adds water far above plant needs is not well known in this climatic region.

At the least, we can say that irrigation schedules would have to be arranged to recognize critical growth periods and to accomodate to natural climatic factors if crop growth is to be maintained at present levels. Likely the total water proposed to be added would have to be severly reduced.

--Potential nitrogen removal from applied wastewaters was another concern during discussion of the first draft on November 27 when some 80 inches of water application was envisioned. In the revised draft it appears that some 134 inches are suggested. We can say, that this is totally unrealistic even without pilot studies as proof. In Penn States studies 45-60 inches were found realistic on croplands.

Apparently this rate is suggested to make it appear that less land would be necessary in a land spreading system! It appears to be based on expected denitrification losses (about one-third of applied N) and on a belief that nearly all the nitrates can be used by the crops as the water passes vertically through the root zone. Both assumptions are unproven!

In the document denitrification is said to occur mainly at the water table. In porous sandy soils like these, if drainage were improved to the expected levels, appreciable amounts could occur only there. Yet denitrification depends wholly on an energy (carbon) source available and this is not present in deep subsoils where the water table will occur. Since soil is such an efficient filter we can't count on dissolved or suspended organics passing down to this level to furnish this source. We believe that there are no adequate studies of denitrification under field conditions to give us assurance of such losses.

Tile drainage waters from flat wet lands are known to contain appreciable nitrates especially at peak mineralization periods in May and June. If denitrification occurred efficiently in the saturated zone where tile is placed, none or little nitrate would be found in tile drainage water.

Projected irrigation schedules plus natural rainfall will be presuming that about 160 inches of water would pass through the soil annually probably some 5 times the normal crop demand. How so much water can be forced through porous sandy soils and achieve sufficient removal of nitrates by crop root feeding is well beyond our understanding.

In summary, one of the reviewers stated on November 27 the belief that half the original predicted rates of 80 inches would be more reasonable. Instead of profiting by this you appear to have increased the projected water usage.

-----The estimated useful life of a system for phosphate immobilization was another concern. We won't dwell on this but will recall our discussion of November 27 when this was a real concern of several reviewers.

Two statements in the revised draft says that "loam soils" provide sufficient adsorptive capacity for 100 years and that on coarse textured soils the capacity is maintained in short-time frame by aluminum and iron content in the soil to form sparingly soluble compounds of phosphorus.

As stated earlier most of the farmland soils in the Kankakee Valley are sands and sandy loams with very porous subsoils, and lack the fine materials in upper layers as well as in subsoils to behave as "loams" mentioned. In addition, because they have developed under wet conditions, they may actually be lower in free iron, aluminum and manganese than well drained soils. Also they generally have only slight acidity or are near neutral so that little of the iron and aluminum can react with phosphates to form insoluble compounds.

In summary we agree more with one of the reviewers who stated that the phosphorus fixing life of a system on sandy soils might be only a quarter to a third that stated in your paper or perhaps, 25-35 years. After that time dissolved phosphates could move through the soil along with nitrates to arrive in drainage waters.

--Heavy metals accumulation in soils and their effects on crops is another concern. The paper states that heavy metals are not considered a problem even though they may accumulate in soil receiving sludges or wastewaters. Research on use of sludge having 100 times the concentration of metal ions present in treated wastewaters was referred to. It was stated that after using sludge on land, "amounts of some essential and non-

essential chemical elements in the plant tissue may increase (yet) there was no evidence that the accumulation would be hazardous to animals consuming the produce." We wonder whether such research:

1. Dealt with sludges from a highly industrialized area such as C-SELM.
2. Actually included feeding of crops produced to animals on a long-time basis.
3. Was performed on sandy soils of low cation exchange capacity where finite saturation of soil by such heavy metals might be achieved rather early in the life of a land treatment system.

It seems that this area is lightly discussed in comparison to concern that both scientists and citizens feel. We believe that introduction of rye into the systems as potential cattle feed will increase this concern. We don't believe that you can dismiss this by stating that since potentially hazardous concentrations of elements occur when there is a "nutritional imbalance" the management practices proposed here "would preclude a harmful buildup from even occurring". Boron and sodium are other elements of concern which aren't considered in the document but are known to be present in wastewaters.

--Choice of crops for use in a land treatment system was another concern. The document states that corn and rye intercrop have been chosen only as examples of the elements needed in a system. Yet the degree of detail used in discussion including supporting tillage practices and other cultural practices needed, choice of hybrids and calendarization of operation including the water application makes it appear that this crop combination is a well understood, well documented, highly desirable system with considerable appeal to farm people. In fact, such a system has never been used to our knowledge with all the constraints and on productive soils as existing here. It would mean a radical change in farm practice for owners, investment in forage, harvest, and storage equipment, beef cattle for utilization and a whole new management technique and farm practice. This probably won't appeal to a large segment of operators.

Since corn for grain is not a particularly high remover of nitrogen from soils, other crops should be explored. On November 27, this was suggested by several reviewers. Sorghum was offerred as one grain which might be superior in its ability to use nitrogen. Non-nodulating soybeans, with their high protein content and high N removal, were also suggested possibilities. These soybean types would rely on N removal from soils rather than N fixed by nodules as in most soybeans.

We strongly suggest that your final paper consider additional alternative cropping management systems!

Pilot study needs is another important area of concern. In your comments in preface page 3 you state that the "land as a treatment process is least understood" by the public and that necessitated preparation of this document. You treat pilot testing briefly on the preface page 2 calling for "construction of pilot treatment facilities for whatever technological process is ultimately selected for implementation."

Our foregoing comments and examples have pointed out constraints we see in operation of a land treatment system for wastewater. It appears obvious that we shouldn't expect farmers to understand how they could adopt successfully to such a system, or officials to know how successful such system might be by a study of this document alone.

We suggest that the pilot testing phase of your document receive much more emphasis and be placed at the end of the report in unmistakable form.

In our view a pilot study should be on a farm-operating basis so that farm practices could be tested on field scale to learn if they can be coordinated with the demands of wastewater cleanup schedules. Several crop systems should be studied; several rates of water application tested; weed, disease and insect variables should be assessed; tillage and fertilization systems should be coordinated; crop yields must be estimated and farm income changes determined. Finally the fate of nitrogen, phosphorus, heavy metals, boron, sodium and other compounds should be studied by careful monitoring. And, of course, the quality of return water from such systems must be learned! All of this should be continued over time sufficient to encounter all eventualities and work out the operating problems.

This should not necessarily be geared to a prototype model which must be justified by its being included later in an operating plan of water management. It is too important in itself to need such justification.

Conclusion

Our comments have been aimed at being constructive. We hope you will take them seriously and consider them in formulating your final document. Purdue University can not use this present document as a basis for an information program for Indiana people. Neither does Purdue wish to have its name used in conjunction with release of this document for any purpose.

We would strongly suggest that the Corps seek advice and counsel of other individuals and organizations in the agricultural community in Indiana before planning any general release of your final document. This would apply whether you plan a large open meeting, a general mailing, or meetings where you would attempt to inform groups of farm people or public officials about land treatment technology.

Thanks again for this chance to see the second draft of your document! In order that you may have the specific comments of reviewers we will prepare an appendix which will be a supplement to this letter.

Sincerely yours,

Harry M. Galloway
Extension Agronomist

HMG/pl

DEPARTMENT OF THE ARMY
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NCCPD 5 January 1973

Dr. Harry M. Galloway
Extension Agronomist
Cooperative Extension Service
Purdue University
Lafayette, Indiana 47907

Dear Dr. Galloway:

This is in reply to the constructive comments furnished this office on our draft informational paper entitled "The Use of Land As a Method of Treating Wastewater."

We are very grateful to you and the other staff members of the Purdue University, College of Agriculture, for your continued interest and help in formulating agricultural management practices for use in planning a land treatment system for renovating wastewater. We realize that from the scientist's viewpoint, the informational document probably has some shortcomings. It was not our intention to develop design criteria, but simply to show how the land treatment system might be integrated with and complement the present cultural practices used in a farming region. While it is true that some of the practices suggested in this paper have not been widely adopted by farmers, they are nevertheless practices which have been developed and promoted by soil conservationists during the last 20 years. All that is needed to renovate wastewater is the application of appropriate soil, crop, and water management practices.

In order to establish a clearer understanding of the questions or concerns expressed, the following comments are furnished for your consideration. These comments are presented in the same spirit and order as set forth in your letter.

<u>Page 2, Comment 1</u>. The basic objective of the land system is to reclaim wastewater by providing the equivalent of advanced water quality treatment. Since the process design relies on plant uptake as one of the basic internal mechanisms, good agricultural practices are essential to the system's management. With the installation of an integrated irrigation and drainage system, the participating farmer is afforded the opportunity to increase his crop production by adopting a higher planting program. Furthermore, with application of treated wastewater, the cost of fertilizer included in his

production budget can be appreciably reduced - the degree being dependent upon the amount of waterborne plant nutrients applied per acre. Thus the potential for raising farm income is really the by-product of the system's design and operation, but nonetheless readily attainable.

Page 2, Comment 2. The intent of the paper was to answer the questions concerning the land treatment process by simply explaining its design and operational concepts. Research and actual field plot tests have provided sufficient scientific knowledge to realistically complete a survey-scope design. Involved are the soil's physical and chemical mechanisms, the biological processes, and the natural crop uptake - all of which form the basis for designing the farmer's present management and cropping practices. Any form of reduced tillage as well as conventional tillage can be used with the land system. Due to its comparative newness, however, a more detailed explanation of no-plow tillage was included, but only as a matter of information. Its emphasis was meant to reflect the work being done by the various equipment manufacturers and the many universities including Purdue because of the concern over soil compaction, field erosion and labor availability. Double cropping with rye was originally conceived as a means to provide a cover crop for erosion control and also increase the soil's organic and carbon content and thereby the soil's nitrogen and phosphorus banking capacity. In net effect, the rye is thus able to help keep the nutrients immobilized in the soil surface until they can be adsorbed by the corn root system. The adoption of similar types of management practices is probably the only way one can maintain present yields on sandy soils with inorganic fertilizer application and keep nitrate concentration in drainage water at safe levels. Under such a management proposal, the net nitrogen uptake by the rye would be zero, once a steady-state condition is reached. Harvesting the rye as a forage crop resulted from the State of Illinois's interest in improving the Midwest share of beef production. By so doing, the waterborne nitrogen application had to be increased to replace the nitrogen removed from the system by harvesting the rye. The combined production of high yield grain and high-protein forage would most likely result in new or expanded feedlot and/or on-farm beef operations. Furthermore, treatment of the animal wastes could be easily integrated into the land system's design.

The cost and management implications of growing rye as a second cash crop was recognized. The necessity for using relatively expensive contact herbicides is a requirement of no-tillage operations which uses chemical energy rather than the mechanical energy of conventional farming. Consequently, the relative cost and labor considerations of both types of tillage were identified for consideration by the participating farmer. In discussing the impact on the farmer, it was recognized that the cost of aerial inter-seeding including the seed cost would, in all probability, have to be borne by the legally designated operating entity, not the farmer. On the other hand, the out-of-pocket cost for harvesting and processing the rye was assumed to be offset by its market value for beef production. If this assumption proves invalid over time,

either the increased cost would have to be reimbursed by the operating entity or less nitrogen applied per acre and the rye retained only as a protective cover and mulch crop.

The problem of a cooler (mulch covered) no-tillage seedbed was considered in two ways. First was to recommend the use of early maturing corn varieties which requires less growing degree days equivalents and facilitates calendarization of field operations. Secondly, the planting population with its applicable cost were adjusted to include "over-plant" allowances for this and other types of field concerns with the additional recommendation for relatively shallow planting.

In addition to recognizing and calculating costs to offset the new weed management problems induced by no-plow tillage, the possibility of lesser yields, when using earlier maturing hybrid was acknowledged. It was for this and other reasons that such a high factor of 15 to 20 percent for field losses was used in differentiating between the expected harvested yield and the planting program.

Planting thicker populations than now being used will result in higher yield potentials, primarily because of the system's inherent design advantages. Past field research has shown that increased plant population with the applicable fertilizer program could be sustained as long as a moisture deficit severe enough to produce wilting or long periods of moisture stress can be avoided. Conversely, to avoid any lodging problems due to high moisture content, the drainage system is designed to maintain an unsaturated and aerated condition within the root zone. Moreover, application rates are predicated on the nitrogen requirements of the two crops and the banking capacity of the crop residue.

The suggested calendarization provides adequate time frames for first reaching physiological maturity and then attaining the desired field drying before harvesting is begun. Almost without exception, the moisture content of all hybrids at physiological maturity should approximate 35 percent as anticipated. Maintaining a balanced fertility program and good soil (drainage) environment also will help insure that the corn's moisture content is only what one would expect in a healthy plant. Use of early maturing hybrids facilitating coming out of the field with corn at comparative lower moisture content was of real interest to the several farmers who participated in preparing the paper. As more farmers dry and store their own grain, the cost of drying is becoming more of a significant production budget factor then the yield differential between hybrids. However, in analyzing the applicable production costs, no credit was claimed for this consideration. Instead the costs for hauling, storage, and drying were increased to reflect the expected higher yields and accruable production charges.

Page 2, Comment 3. The assumed value of the water was based only on its nutrient value and the system's ability to sustain a planting program equivalent

to 200 bushel-per-acre corn. The increased yield would be sustained by maintaining a higher (waterborne) fertility and planting population. Since the treatment process must provide the irrigation and drainage system at no cost to the farmer, the adoption of a significantly higher fertility program is logical in what would become a controlled, minimum risk production situation.

Droughty type sands was not a prerequisite in the criteria used to select the land sites. Rather, topsoils with high infiltration rates such as sandy loams or silty loams overlying a sand or coarse-textured glacial outwash which has a moderately rapid to rapid percolation rates were sought. Furthermore, the higher the ground water table, the easier and more positive is the control of water movements within the soil column.

Irrigation in this part of the Midwest has not provided the net return many consider warranted. Generally a payout period greater than most are willing to accept, is required to write-off the necessary capital investment. Consequently the increased crop yield will not provide a return sufficient to justify the annual costs normally associated with the installation. However, the very fact that many farmers either have attempted or presently use some variation of irrigation verifies its value. With the irrigation and drainage systems installed as part of the treatment process, these costs will not be borne by the farmer. Therefore, the incremental costs to the farmer's present production budget should prove minimal in relation to the expected increased returns.

The rate of application, while correlated to the nitrogen requirements should not prove injurious to the cover crops. The volume would be detrimental only if retained within the soil. However, the application rate is only a fraction of the soil's percolation rate so that the drainage system should easily maintain an unsaturated and aerated condition in the root zone. Wet soil conditions during ovule production should not occur and be a problem because of the proposed drainage system. The drainage system will be designed to maintain the water table at an average depth of five to ten feet below the soil surface. Furthermore, the drainage system will not permit the water table to approach the surface to a depth less than three feet for a period greater than two days during any maximum precipitation period.

According to information that we have collected, corn losses from smut are greatest when corn suffers from a moisture deficiency, rather than during wet growing seasons. Thus, smut losses are likely to be decreased under conditions resulting from heavy irrigation. At any rate, most corn varieties now have good resistance to the disease and yield losses attributable to smut are less than two percent of the total (North Central Regional Extension Publication No. 21 "Diseases of Corn in the Midwest").

The high plant populations proposed in the paper do not appear to be out of line in view of a dependable supply of water and the information presented in Research Bulletin 961, January 1969, University of Missouri, entitled

"Plant Population and Row Spacings Influence Maximum Corn Yields." We believe that, in the near future, corn breeders will put a great deal more emphasis on the development of corn varieties which will give a more favorable response to additional water and plant nutrients than those we now have available.

Page 3, Comment 4. The number of inches to be applied were determined by equating the nitrogen concentration of the treated wastewater to the total nitrogen lost or removed from the total biosystem. Under steady-state conditions, the total nitrogen losses would be equivalent to the sum of: (1) the amount removed by harvesting the corn grain and rye forage; (2) the residual allowable under the higher water quality standard; and (3) the losses attributable to volatilization. A breakdown of these losses are included in the revised version of the draft paper. The 80± inches referred to is the equivalent nitrogen requirement for the total corn plant, portions of which are recycled and never removed from the system. Of the 134 inches, only 91 inches are necessary to provide the nitrogen contained in the harvested crops. Moreover, of the 91 inches only 58 inches are for the harvested corn including both the corn grain and a portion of the stover picked up when the rye is harvested.

The amount suggested for application is based solely on the nitrogen requirement of the two harvested crops plus the anticipated nitrogen volatilization and drainage losses. If double-cropping does not prove economically justifiable, and acceptable to the participating farmer, then more land would be necessary since application would be less per acre. Within the proposed cropping program, the projected dentrification losses have been verified by experts whose work has concentrated on this particular aspect of nitrogen behavior and movement in the soil. The 30 percent loss of nitrogen by denitrification processes and ammonia evaporation from the soil surface is a very conservative estimate in view of most recent reports of research results. We can, of course, document this statement, but assume you are familiar with the results reported in several papers presented at the 1972 American Society of Agronomy Meeting in Miami. With our proposed management practices, excessive nitrogen concentrations should not reach the water table. Moreover, most of the nitrogen in the wastewater is initially immobilized in the surface layer. Only later is the nitrogen released and then over time as the crop uptake requirements increase. This underscores the importance of the crop mulch and its carbon-to-nitrogen ratio. Thus, the decomposition rate of the plant residues actually becomes the key aspect of the nitrogen cycle and not, as you recognize, uptake from the water as it passes through the root zone. It was this natural banking capacity of the soil that permitted the farmer to grow continuous row crops before supplemental fertilization was practiced.

The text has been revised to clarify that denitrification occurs in the soils only when a low or no oxygen (anaerobic) environment is reached and where there is a source of carbon as energy is available. This will occur above and not at the water table as you have indicated.

The fact that appreciable amounts of nitrates are found in the drainage water during May and June reflects the usual physical leaching that occurs when commercial nitrogen has been applied in one operation. As is discussed in the paper, the carbon-to-nitrogen ratio is sufficiently low around the middle of June to start release or mineralization of some of the nitrogen tied up in the plant residues. Since the nitrogen uptake requirement of the corn is very low at this point in time, a physical leaching could occur in the soil column, unless the application rate is adjusted accordingly. That is why so much emphasis is placed on the time-phasing of application to the total biosystem's needs. By actually applying nitrogen only when and as needed, the most effective nitrogen usage is obtained and minimal nutrient loss to the drainage system is assured.

Since the plant nutrients are waterborne, the variable rates, not the volume of water applied are critical to the design and operation of the system. This also infers that the subsurface hydraulic considerations and drainage design must be predicated on: (1) the maximum rates of application and local rainfall characteristics; (2) the rate of infiltration at the soil's surface; (3) percolation coefficients within the soil column; and, (4) the natural movement of water through the underlying saturation zone. Since the design rate of percolation is only a fraction of the soil's percolation capacity, the vertical movement of water should be slow enough to permit the various nitrogen removal mechanisms to function properly.

Page 4, Comment 5. The phosphorus immobilization capacity of the sandy loams in the Kankakee Valley are not as long-lived as in the heavier loams or clay soils. The adsorptive capacity of the limited iron and aluminum contents within the selected sites; soils, however, should be extended by the iron and aluminum contained in the wastewater from the industrial plants. The design calculations based upon numerous soil analyses, indicate that the phosphorus fixing life of the system will extend beyond 50 years, the selected economic life of the process. Once the phosphorus content of the drainage water begins to approach the design concentration near the bottom of the soil column, the system operators could further extend the system's physical life by simply treating the irrigation water with iron or aluminum salts or lime to precipitate the phosphorus.

Page 4, Comment 6. The research on the use of sludge was undertaken by the University of Illinois. The sludge came from the Calumet and Southwest plants of the Metropolitan Sanitary District of Greater Chicago. Both these plants treat wasteloads from highly industrialized areas. Interestingly enough the results of the research analysis showed that the concentration levels of any one element were not sufficiently high to warrant consideration of animal-feeding experiments. Furthermore, we have analytical results of heavy metal accumulations from soil samples collected from the sewage farm of Melbourne, Australia. They have applied sizeable concentrations of heavy metals for

many years as a constituent of sewage with no adverse effects. Cattle raised at Melbourne showed no indications of any heavy metal problems. Some of the test plots in the Illinois University study consisted of Plainfield sands which have the same physical properties as the sands in the study area. Since 1969 when the experimental area was operational, the ground water samples indicate that no leaching of the heavy metals in the sludge has occured.

The point of interest is that effluent being applied to the crops contains significantly less concentration of heavy metals than found in the sludge. In the land process, most of the heavy metals are settled out and removed from the system when the sludge is dredged from the storage lagoon. Thus, the corn grain and rye should be safe for use as cattle feed.

Page 5, Comment 7. The degree of detail included in the paper was to answer the many questions raised in regard to the design and operation of the land system. The very fact that such a system would have different impacts on the participating farmer and the agricultural community is itself justification for preparing the paper. By working with the three agricultural groups now being established, the ramifications of the various management techniques and farm practices can be specifically identified and assessed. Subsequently variations in resource use, costs, and socio-environmental impacts for the land and other alternative treatment systems will be presented in the report. These findings should be of assistance to those responsible for ultimately selecting the one system(s) best suited to the area and most acceptable to the people. Moreover, the concepts and design considerations should prove helpful to other local planners as they face the similar need for meeting the new national goal established by the Federal Water Pollution Control Act Amendments of 1972.

The combination of corn and rye was not presented as a design factor, but simply as a means of showing how the system can be managed to provide nutrient removal and maintain soil infiltration capacities. We recognize that there are other combinations of crops that could be used to renovate wastewater. Many of these probably would be incorporated into the systems to meet the needs of individual farmers when they have been sufficiently analyzed and the same degree of confidence in their renovative abilities is verified. The system of corn and rye was presented only as a way of illustrating the principles used in selecting crops to be irrigated.

The type of pilot study you have outlined certainly should be considered over time. However, the Muskegon County, Michigan waste treatment system and demonstration project will provide data to help answer the types of questions which you raise. This project will begin irrigation in the spring of 1973. The Corps is presently evaluating some of the larger of the 509 sites using land for the treatment of wastes in the U. S. We hope that these sites will provide additional useable data. We presently have other studies underway

at the Cold Regions Research and Engineering Laboratory at Hanover, New Hampshire, the Waterways Experiment Station in Vicksburg, Mississippi, and Fort Devens, Massachusetts, to gain additional information. Several military reservations are considering installing land treatment systems to treat all, or a part of, their wastes. Hunter-Liggett Military Reservation, California is the leader in this venture. Considering all of these data acquisition studies, we will have a considerable quantity of data pertaining to land treatment systems on hand before any of these systems being planned could be implemented.

In closing, I wish to express my personal appreciation for the time and effort that you and other members of the University have devoted in helping us prepare the paper. With regard to the understanding of the system, thanks to the agriculture scientific community, we have as much information, perhaps more, with regard to soil processes and properties than the sanitary engineers have for some of the other wastewater treatment systems already accepted by the general public.

It is our hope that by working with various individuals and organizations in the agricultural communities in both Indiana and Illinois, the final system design and evaluations can be improved.

Sincerely yours,

James M. Maas

JAMES M. MAAS
Chief, Planning Division
Chicago District, Corps of Engineers

COOPERATIVE EXTENSION SERVICE
COLLEGE OF AGRICULTURE / URBANA, ILLINOIS / 61801

213 Mumford Hall
Urbana, Illinois 61801
February 2, 1973

Mr. James Maas, Chief
Planning Division
U.S. Army Engineer District, Chicago
219 S. Dearborn St.
Chicago, Illinois 60604

Dear Mr. Maas:

Thank you for the opportunity to review the paper "The Use of Land as a Method of Treating Wastewater" (December 1972). I will be happy to serve on the Agricultural Advisory committee established for the study (Letter dated December 21, 1972).

The land treatment concept is a sound approach to waste water treatment as long as we do not overload the system. The tendency is to apply the maximum amount of waste water and nutrients which is the most economical approach but does not give much lattitude for errors. This is no real problem as long as the system is adequately monitored and provisions are made for possible adjustments. I feel that a few test wells will be required to keep a check on the nitrogen, phosphorus and heavy metal content of the water in the saturated soil zone as well as that from the tile drains.

The operational and management considerations are based on sound agricultural concepts but I would again point out that the goal is to treat the maximum amount of water. For example growing 200 bushels of corn on sandy soils using a short season corn variety may not be reached. If you can't get 200 bushels of corn per acre an adjustment must be made in the amount of waste water applied. I don't feel that this is a serious problem as long as the system is monitored and adjustments are made. We are making progress each year on the maximum yield of corn and we may be able to grow more than 200 bushels per acre by the time this program is implemented.

I do not believe that we have all the answers to how much nitrogen can be applied to corn at this time. There is some question if we can grow 200 bushels of corn per acre without permitting excess nitrates from going through the soil profile.

The next most important consideration from my point of view is the prototype land treatment model. A complete model should be installed only after the system is tested on a much smaller area,

perhaps on three or four farms for a period of three to five years. We could see if farmers are capable of growing 200 bushels of corn per acre on their soils, if high yields of corn can be grown with over 100 inches of water, determine the best timing of water applications, to check the design and effectiveness of the drainage and irrigation system, and check the total mechanism of nitrogen, phosphorus and heavy metal removal.

It would be helpful if a similar soil area near the test area were available to use as a check plot.

There are many other points in the paper that I question but are really very minor in terms of preceeding with installation of the system. These include:

1. Developing the fields for use as revenue producing hunting areas during the winter season is probably more of a public relations consideration recommended by USDA than a practical consideration. The amount of game produced with the high intensity farming system will be small in most cases and the farmer would prefer not to have hunters on his land because of damage done by the hunters.

2. Other cropping systems should be considered, however, the corn-rye system is the best that we are able to recommend in view of the project objectives. Other commercial crops that might be considered are soybeans or alfalfa. They would use more nitrogen but would probably not be as tollerant to large applications of water. The number of acres needed to use the nitrogen could be reduced by growing a forage crop such as Reed Canary grass, providing a market is developed. It may be more important to use the least amount of land possible because of social and political considerations.

3. The no tillage system of growing corn is a new system of grain farming and very effective in controlling soil erosion. Yields have generally been equal to or higher than conventional systems on well drained soils. While drainage will be provided, I do not know what affect the large amount of water will have on corn yields. I would expect them to be satisfactory. The no tillage system will take less equipment only if the farmer is willing to eliminate his mold-board plow, disk, et cetera.

Our experience with 5 to 6 years of various tillage systems for growing corn in Illinois

including no tillage system hasn't indicated greater insect or disease problems than with conventional systems.

4. I can't see any reason for beef production to increase as a result of the waste water project. It is true that rye could be used as a forage and high yields of silage could be produced with the system. There is no pool of knowledge for growing beef in the possible project area that I am aware of. The system could work well with dairy in the McHenry County area where there is lot of dairy. The system could produce large tonages of corn silage and the rye could be green chopped or pastured. The acreage for waste water disposal would have to be increased to handle the nutrients from the animal waste or different land would have to be available for animal waste utilization.

In summary, I would encourage the Corp of Army Engineers to proceed with the study. I think it can work from a technical point of view but some adjustment will be required that no one can predict at this time. The social and political consideration will probably be the major problems to overcome.

Yours truly,

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